United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with Missouri Department of Natural Resources and Missouri Agricultural Experiment Station

Soil Survey of Livingston County, Missouri

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How To Use This Soil Survey

General Soil Map

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

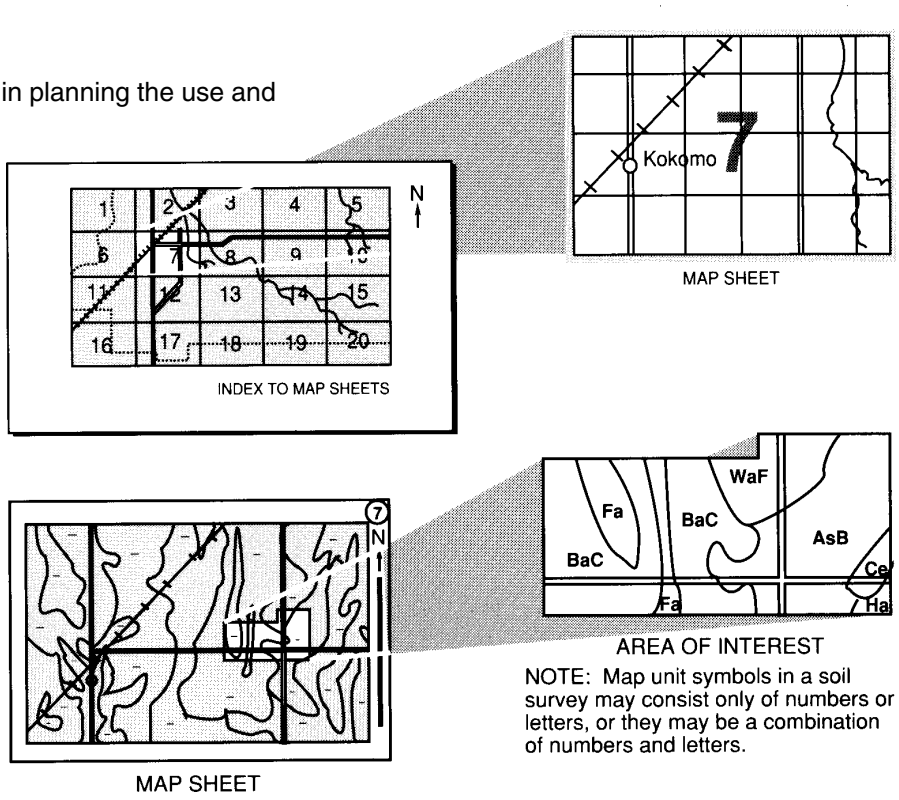
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1995. Soil names and descriptions were approved in 1995. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1995. This survey was made cooperatively by the Natural Resources Conservation Service, the Missouri Department of Natural Resources, and the Missouri Agricultural Experiment Station. It is part of the technical assistance furnished to the Livingston County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: An area of native warm-season grasses in the Lagonda association in Livingston County.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service homepage on the World Wide Web. The address is http://www.nrcs.usda.gov.

Contents

Issued 2002

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land user identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described, and information on specific uses is given. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Roger A. Hansen
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Soil Survey of
Livingston County, Missouri

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Fieldwork by Mark A. Abney, Douglas R. Berka, and Mark D. Frazier, Natural Resources Conservation Service, and Jody B. Mayes, Jerry L. Smith, and Thomas G. Morgan, Missouri Department of Natural Resources

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the Missouri Department of Natural Resources and the Missouri Agricultural Experiment Station

Livingston County is in the Green Hills Region of north-central Missouri (fig. 1). It is in the Iowa and Missouri Heavy Till Plain major land resource area (USDA, 1981). The total area of the county is 345,094 acres, or 539 square miles. Chillicothe, the county seat, is 70 miles east of St. Joseph and about 85 miles northwest of Columbia.

In 1990, the population of Livingston County was 14,306 and that of Chillicothe was 8,152 (Missouri Department of Agriculture, 1990).

This survey updates the soil survey of Livingston County published in 1956 (USDA, 1956). It provides additional information and has larger maps, which show the soils in greater detail.

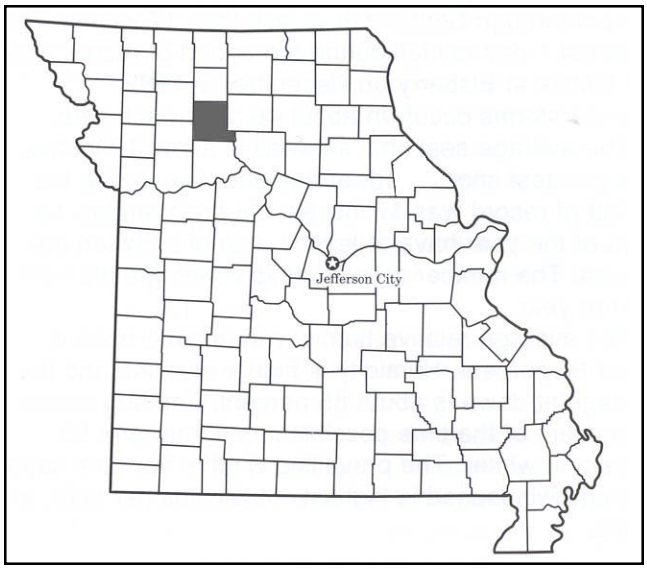

Figure 1.—Location of Livingston County in Missouri.

General Nature of the County

This section provides general information about Livingston County. It describes climate; history and development; farming; and physiography, relief, and drainage.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Chillicothe in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 28.7 degrees F and the average daily minimum temperature is 18.7 degrees. The lowest temperature on record, which occurred on December 23, 1989, is -26 degrees. In summer, the average temperature is 74.8 degrees and the average daily maximum temperature is 86.0 degrees. The highest recorded temperature, which occurred on August 29, 1984, is 109 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 36.51 inches. Of this total, 24.4 inches, or about 67 percent, usually falls in April through September. The growing season for most crops falls within this period. The heaviest 1-day rainfall on record was 6.43 inches on September 14, 1998. Thunderstorms occur on about 51 days each year, and most occur between April and September.

The average seasonal snowfall is 16.4 inches. The greatest snow depth at any one time during the period of record was 20 inches. On the average, 20 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 58 percent. Humidity is higher at night, and the average at dawn is about 81 percent. The sun shines about 72 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the south, except during February and March, when it is from the northwest. Average windspeed is highest, 12 to 13 miles per hour, in March and April.

History and Development

Roy Hicklin, county commissioner, Livingston County, helped prepare this section.

For hundreds of years Indian tribes occupied the survey area. Many arrowheads and stone axes and some bits of pottery found in the streams and in ancient campsites are evidence of these inhabitants.

Both Spain and France claimed the land that includes the survey area in the years between 1684 and 1803. Possession of the area was given to the United States in March 1804, and Spain and France relinquished all claims. Missouri became a State on August 10, 1821.

At different times, Livingston County was part of Howard County, Ray County, and Carroll County. On January 6, 1837, Livingston County was established by proclamation by Governor Dunklin. The first county court, appointed by Governor Boggs, met on April 6, 1837.

After the Indian inhabitants, among the earliest settlers in the survey area was Samuel Todd. His home was west of Utica on "Orchard Hill." He is believed to be the first to grow corn in the area and had the first grinding mill in Livingston County. Settlers came to the southern part of the county in 1833 and to the northern part in 1838 and 1839.

Two resources were essential to the early settlers: water and wood. Many of the first homes were on the edge of the prairie, close to timber and a good spring of water. Because of its tall grass and tough roots, prairie land was difficult to work. Once it was cleared, timbered land was productive and could be easily worked.

Early settlers had a difficult time with cash flow. Beeswax and furs were two products that could be traded for cash. Livingston County's distance from major markets made it difficult to grow crops for profit.

For some time the bottom land was open range, and cattle were branded and grazed on the prairie grass commonly called "ripgut." A vote to restrain livestock was defeated in 1825, but the measure was voted into law in 1842. The county had open range for at least 2 more years. When fences were built, they were made of rails. Barbed wire did not come into use until after the Civil War.

In 1837, Chillicothe was designated as the county seat and John Graves was employed to lay out lots. The site was chosen in part because it is the geographical center of the county. Chillicothe, which is an Indian name meaning "big town where we live," grew slowly. By 1858, the town had a population of about 1,000 (National Historical Company, 1886).

The population of Livingston County has declined from a high point of more than 22,000 in 1900 to about 15,000 at the present time. In addition, the population has shifted from the rural areas to the city of Chillicothe. Approximately two-thirds of Livingston County's residents live in Chillicothe.

Farming

Farming is the main enterprise in Livingston County. Livestock, livestock products, and cash crops are the major sources of income. Most livestock enterprises raise beef cattle, hogs, dairy cattle, sheep, or chickens. The principal crops are corn, soybeans, wheat, grain sorghum, legumes, and grasses. Forested areas are mostly on the steep escarpments along the major streams and rivers (Missouri Department of Agriculture, 1990).

The general trend since 1930 has been toward fewer and larger farms and an increase in the use of fertilizers, chemicals, and larger machinery.

Physiography, Relief, and Drainage

The landscape of Livingston County consists of gently rolling to hilly uplands, old alluvial terraces, and wide flood plains. The northeastern part of the county is gently rolling, the northwestern part is hilly, and the southern part is rolling.

West of the Thompson River, hills rise steeply from the stream channels and the cultivated land is limited to smooth ridgetops and gentle slopes in valleys. The steeper slopes are normally pastured or are wooded. In the northeast, north of the Grand River, hills rise gently from most of the stream channels and all of the soils can be cultivated. In the southeast, the ridgetops are moderately broad and the hills rise steeply from the stream channels only along the larger streams. Soils in the smaller valleys can be cultivated, but soils on the steeper slopes bordering the valleys of the major streams are used mainly as pasture. In the southwestern part of the county, most of the uplands are rolling and there are only a few steep hills. Exceptions are a few square miles around Blue Mound and the area between Mooresville and the Grand River, where the landscape is hilly and very irregular. The ridges are narrow, and the valleys are steep-sided. Areas of broken land in Livingston County are very limited and are adjacent to the rivers and streams (USDA, 1956).

Nearly all the land is drained by the Grand River and its tributaries. The Grand River flows through the county from west to southeast. Near the center of the county, the Thompson River flows into the Grand River. These two rivers are broad and deep and have flood plains 2 to 4 miles wide. Medicine Creek in the east and Shoal Creek in the southwest are large stream systems that have flood plains 1 to 2 miles wide. These systems drain into the Grand River.

Levees have been built along the larger streams to protect crops from flood damage. Flood damage is normally greatest in the valleys of the Grand and Thompson Rivers and Shoal and Medicine Creeks.

The county is about 70 percent upland and 30 percent bottom land. The elevation ranges from 640 feet in the southeast to 985 feet near Blue Mound in the southern part of the county (U.S. Geological Survey).

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they

compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils identified on the detailed soil maps in this survey do not fully agree with those in the surveys of adjacent counties published at a different date. Differences are the result of additional soil data, variations in the intensity of mapping, and correlation decisions that reflect local conditions. In some areas, combining small acreages of similar soils that respond to use and management in much the same way was more practical than mapping these soils separately.

General Soil Map Units

The general soil map in this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. These areas are called associations. Each association on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils or miscellaneous areas. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Carlow-Dockery Association

Setting

Landform: Flood plains
Slope range: 0 to 2 percent

Composition

Extent of the association in the survey area: 31 percent
Extent of the soils in the association (fig. 2):
Carlow and similar soils—54 percent
Dockery and similar soils—36 percent
Minor components—10 percent

Minor Components

- Wabash and Zook soils on flood plains
- Vesser and Triplett soils on stream terraces

Component Description

Carlow

Position on the landform: Flood plains
Parent material: Alluvium
Slope class: Level

Dockery

Position on the landform: Flood plains
Parent material: Alluvium
Slope class: Level

2. Greenton-Lagonda Association

Setting

Landform: Ridges and hills
Slope range: 2 to 14 percent

Composition

Extent of the association in the survey area: 33 percent
Extent of the soils in the association:
Greenton and similar soils—45 percent
Lagonda and similar soils—32 percent
Minor components—23 percent

Minor Components

- Gosport soils on backslopes
- Grundy soils on summits
- Chillicothe soils on shoulders and backslopes
- Sampsel soils on footslopes

Component Description

Greenton

Position on the landform: Shoulders and backslopes

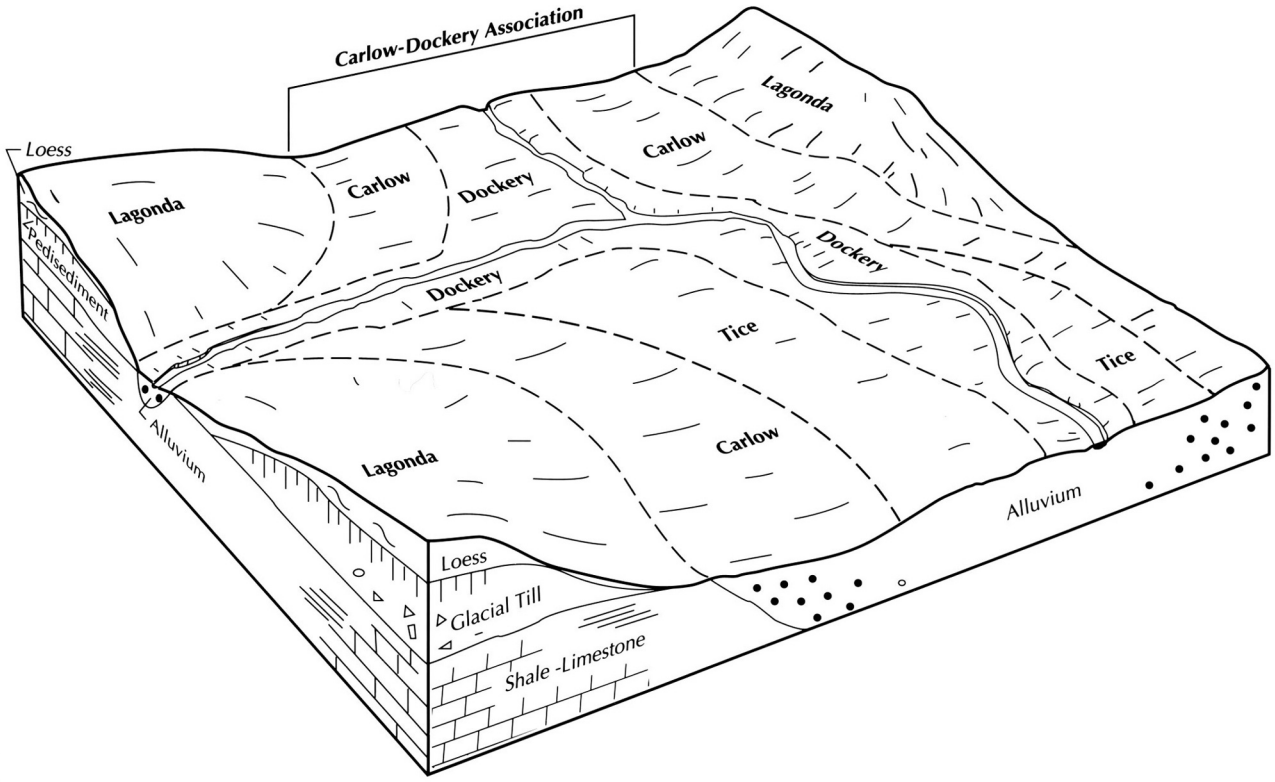

Figure 2.—Typical pattern of soils and parent material in the Carlow-Dockery association.

Parent material: Loess over residuum derived from limestone-shale
Slope class: Gently sloping to strongly sloping

Lagonda

Position on the landform: Summits and backslopes
Parent material: Loess over glacial outwash
Slope class: Gently sloping

3. Lagonda Association

Setting

Landform: Ridges and hills
Slope range: 2 to 9 percent

Composition

Extent of the association in the survey area: 27 percent

Extent of the soils in the association (fig. 3):
Lagonda and similar soils—71 percent
Minor components—29 percent

Minor Components

- Grundy, Sturges, and Crestmeade soils on summits
- Lamoni soils on backslopes
- Vesser soils on flood plains

Component Description

Lagonda

Position on the landform: Summits and backslopes
Parent material: Loess over glacial outwash
Slope class: Gently sloping

4. Locksprings-Greenton Association

Setting

Landform: Ridges and hills
Slope range: 5 to 30 percent

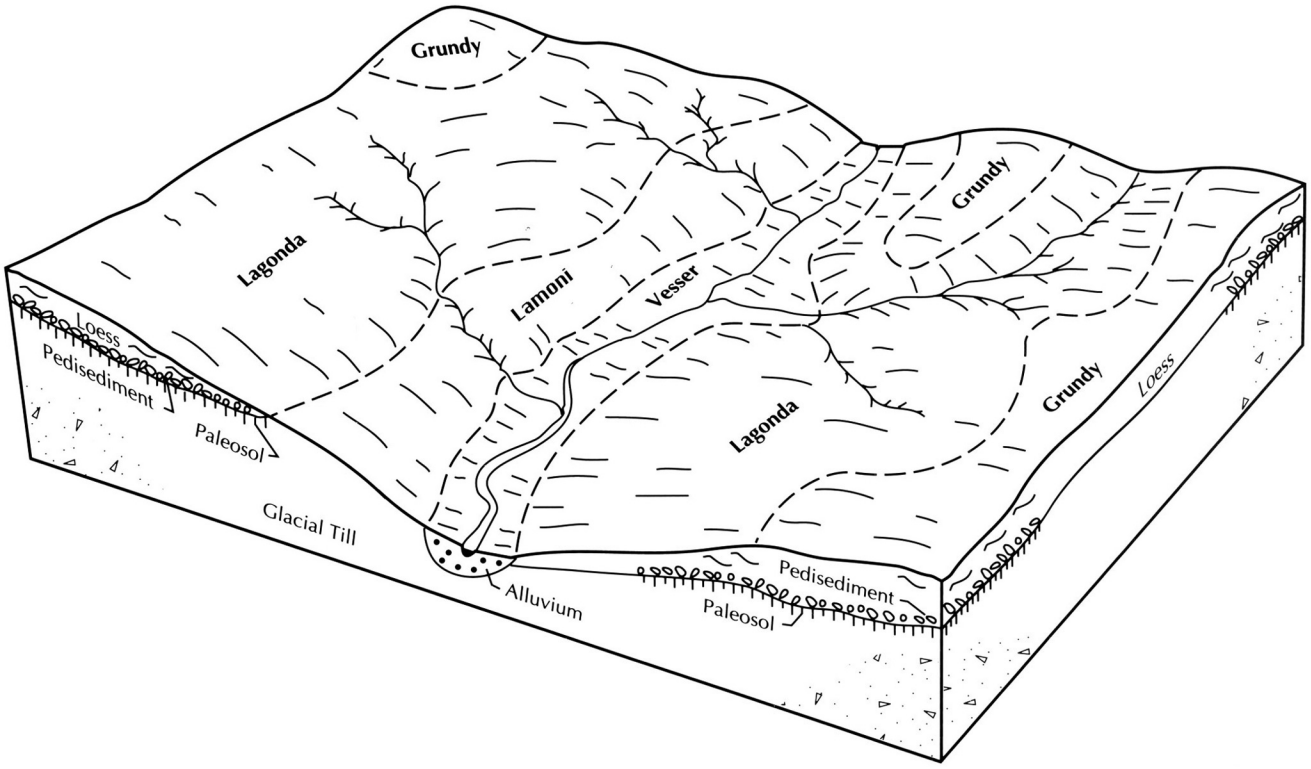

Figure 3.—Typical pattern of soils and parent material in the Lagonda association.

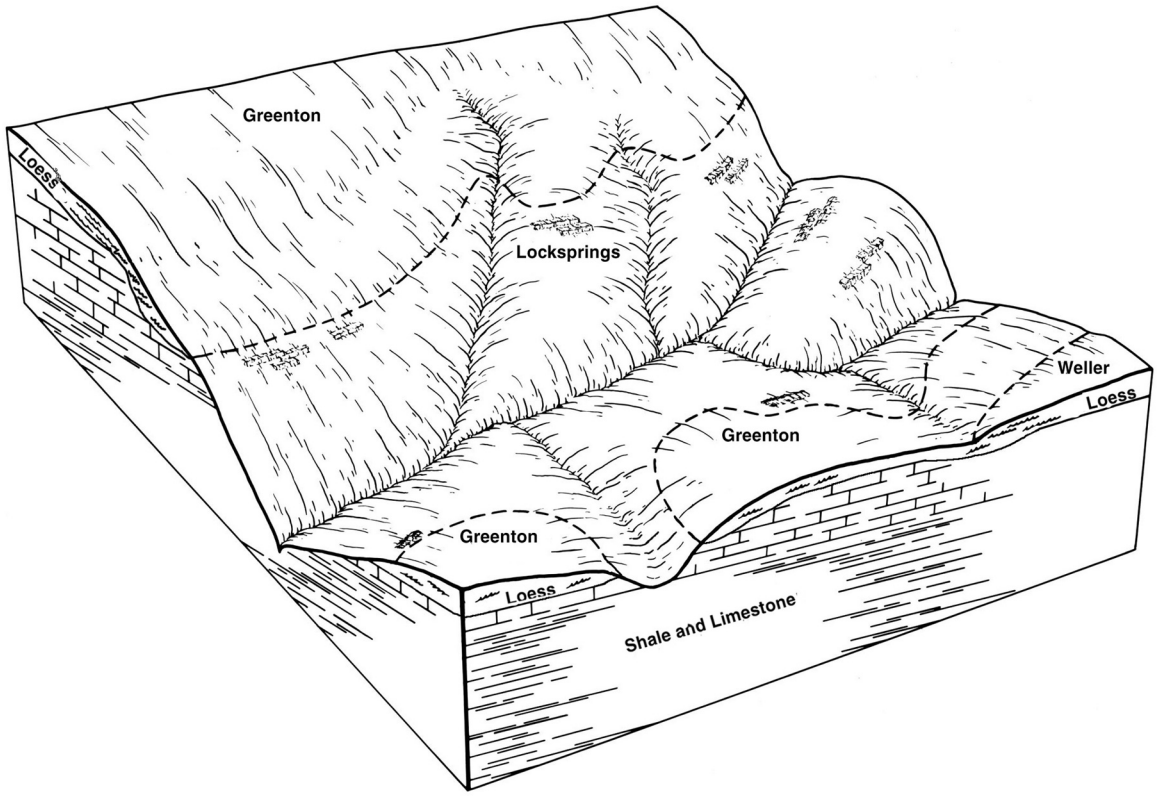

Figure 4.—Typical pattern of soils and parent material in the Locksprings-Greenton association.

Composition

Extent of the association in the survey area: 9 percent
Extent of the soils in the association (fig. 4):
Locksprings and similar soils—49 percent
Greenton and similar soils—17 percent
Minor components—34 percent

Minor Components

- Lagonda and Weller soils on summits
- Colo and Zook soils on flood plains

Component Description

Locksprings

Position on the landform: Backslopes
Parent material: Residuum derived from limestone-shale
Slope class: Strongly sloping to steep

Greenton

Position on the landform: Shoulders and backslopes
Parent material: Loess over residuum derived from limestone-shale
Slope class: Gently sloping to strongly sloping

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The contrasting components are mentioned in the map unit descriptions. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and provides information about soil properties that may need to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a ***soil series***. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into ***soil phases***. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Caleb silt loam, 9 to 14 percent slopes, eroded, is a phase of the Caleb series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are called complexes. A ***complex*** consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Putco-Pits-Dumps complex, 9 to 50 percent slopes, is an example.

This survey includes ***miscellaneous areas***. Such areas have little or no soil material and support little or no vegetation. The Pits and Dumps components of Putco-Pits-Dumps complex, 9 to 50 percent slopes, are examples.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see Contents) give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

10A—Sturges silt loam, 0 to 3 percent slopes

Map Unit Setting

Landform: Till plain

Component Description

Sturges

Percent of the map unit: 100 percent
Position on the landform: Summits
Parent material: Loess over pedisediment
Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: High
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 6 to 18 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 9 inches; silt loam
E—9 to 12 inches; silt loam
Bt—12 to 20 inches; clay
Btg1—20 to 30 inches; silty clay
Btg2—30 to 61 inches; silty clay loam
Cg—61 to 80 inches; silty clay loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

12A—Crestmeade silt loam, 0 to 3 percent slopes

Map Unit Setting

Landform: Till plains

Component Description

Crestmeade

Percent of the map unit: 100 percent
Position on the landform: Summits
Parent material: Loess
Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Medium
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 6 to 18 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 4 inches; silt loam
A—4 to 14 inches; silt loam
E—14 to 26 inches; silt loam
Bt—26 to 52 inches; silty clay
BCg—52 to 70 inches; silty clay loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

14B—Grundy silt loam, 2 to 5 percent slopes

Map Unit Setting

Landform: Till plains (fig. 5)

Component Description

Grundy

Percent of the map unit: 100 percent
Position on the landform: Summits
Parent material: Loess
Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: High
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 12 to 30 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 13 inches; silt loam

Figure 5.—Bales of hay in a typical area of Grundy silt loam, 2 to 5 percent slopes, on till plains.

Bt—13 to 18 inches; silty clay loam
Btg1—18 to 36 inches; silty clay
Btg2—36 to 70 inches; silty clay loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

20F—Locksprings silty clay loam, 9 to 30 percent slopes

Map Unit Setting

Landform: Till plains

Component Description

Locksprings

Percent of the map unit: 95 percent
Position on the landform: Backslopes
Parent material: Residuum derived from limestone and shale
Slope shape: Concave

Component Properties and Qualities

Depth to bedrock: Moderately deep (20 to 40 inches)
Runoff rate: Very high
Depth to restrictive feature: More than 28 inches to bedrock (lithic)
Available water capacity: Very low (0 to 3 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: High (4 to 8 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 18 to 36 inches
Drainage class: Moderately well drained

Typical Profile

A—0 to 7 inches; silty clay loam

Bt—7 to 28 inches; very bouldery clay
R—28 to 80 inches; unweathered bedrock

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Rock outcrop

Estimated percent of the map unit: 0 to 5 percent

21B—Weller silt loam, bench, 2 to 7 percent slopes

Map Unit Setting

Landform: Till plains

Component Description

Weller

Percent of the map unit: 95 percent
Position on the landform: Footslopes
Parent material: Loess
Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Very high
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 24 to 48 inches
Drainage class: Moderately well drained

Typical Profile

A—0 to 11 inches; silt loam
Bt—11 to 40 inches; silty clay
BCg—40 to 80 inches; silty clay loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Soils that have a thicker surface layer than that of the Weller soil

Estimated percent of the map unit: 0 to 3 percent

Poorly drained soils that have a thicker dark surface layer than that of the Weller soil

Estimated percent of the map unit: 0 to 2 percent

22C—Weller silt loam, 3 to 9 percent slopes

Map Unit Setting

Landform: Till plains

Component Description

Weller

Percent of the map unit: 100 percent
Position on the landform: Summits
Parent material: Loess
Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Very high
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 24 to 48 inches
Drainage class: Moderately well drained

Typical Profile

A—0 to 10 inches; silt loam
Bt—10 to 35 inches; silty clay
Btg—35 to 60 inches; silty clay loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

26C2—Chillicothe silty clay loam, 5 to 9 percent slopes, eroded

Map Unit Setting

Landform: Till plains

Component Description

Chillicothe

Percent of the map unit: 98 percent
Position on the landform: Summits
Parent material: Loess over residuum derived from limestone

Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: High
Depth to restrictive feature: 60 to 80 inches to bedrock (lithic)
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 24 to 42 inches
Drainage class: Moderately well drained

Typical Profile

Ap—0 to 10 inches; silty clay loam
Bt1—10 to 19 inches; silty clay
Bt2—19 to 50 inches; silty clay loam
2C—50 to 70 inches; silty clay
2R—70 to 80 inches; limestone

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Soils that have slopes of less than 5 percent

Estimated percent of the map unit: 0 to 2 percent

28C—Greenton silty clay loam, 5 to 9 percent slopes

Map Unit Setting

Landform: Till plains

Component Description

Greenton

Percent of the map unit: 85 percent
Position on the landform: Shoulders
Parent material: Loess over residuum derived from limestone and shale
Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Very high
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 12 to 30 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 13 inches; silty clay loam
Btg—13 to 26 inches; silty clay
2Cg—26 to 60 inches; silty clay

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Soils that are moderately deep to bedrock

Estimated percent of the map unit: 0 to 5 percent

Sampsel and similar soils

Estimated percent of the map unit: 0 to 5 percent

Moderately well drained soils

Estimated percent of the map unit: 0 to 5 percent
Parent material: Loess

28D2—Greenton silty clay loam, bedrock substratum, 9 to 14 percent slopes, eroded

Map Unit Setting

Landform: Till plains

Component Description

Greenton

Percent of the map unit: 90 percent
Position on the landform: Backslopes
Parent material: Loess over residuum derived from limestone and shale
Slope shape: Concave

Component Properties and Qualities

Depth to bedrock: Deep (40 to 60 inches)
Runoff rate: Very high
Depth to restrictive feature: 50 to 60 inches to bedrock (paralithic)
Available water capacity: Moderate (6 to 9 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding: None

Current depth to water table: 12 to 30 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 6 inches; silty clay loam
Btg—6 to 25 inches; silty clay
2BCg—25 to 50 inches; silty clay
2Cr—50 to 60 inches; weathered bedrock

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Gosport and similar soils

Estimated percent of the map unit: 0 to 5 percent

Severely eroded areas

Estimated percent of the map unit: 0 to 5 percent

30B—Sampsel silty clay loam, 1 to 5 percent slopes

Map Unit Setting

Landform: Till plains

Component Description

Sampsel

Percent of the map unit: 90 percent
Position on the landform: Backslopes
Parent material: Residuum derived from shale
Slope shape: Concave

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: High
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: High (4 to 8 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 0 to 18 inches
Drainage class: Poorly drained

Typical Profile

Ap—0 to 15 inches; silty clay loam
Btg—15 to 60 inches; silty clay loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Grundy and similar soils

Estimated percent of the map unit: 0 to 3 percent

Greenton and similar soils

Estimated percent of the map unit: 0 to 3 percent

Seepy areas

Estimated percent of the map unit: 0 to 2 percent

Eroded areas

Estimated percent of the map unit: 0 to 2 percent

34B2—Lagonda silty clay loam, 2 to 5 percent slopes, eroded

Map Unit Setting

Landform: Till plains

Component Description

Lagonda

Percent of the map unit: 100 percent
Position on the landform: Summits
Parent material: Loess over pedisediment
Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: High
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 18 to 30 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 9 inches; silty clay loam
Btg1—9 to 17 inches; silty clay
Btg2—17 to 35 inches; silty clay loam
2Btg3—35 to 47 inches; silt loam
3BCg—47 to 60 inches; clay loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

34C2—Lagonda silty clay loam, 5 to 9 percent slopes, eroded

Map Unit Setting

Landform: Till plains (fig. 6)

Component Description

Lagonda

Percent of the map unit: 95 percent
Position on the landform: Backslopes
Parent material: Loess over pedisediment
Slope shape: Concave

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Very high
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 18 to 30 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 8 inches; silty clay loam
Btg1—8 to 20 inches; silty clay loam
2Btg2—20 to 53 inches; silty clay loam
3Cg—53 to 60 inches; clay loam

Detailed profile descriptions are given in the

Figure 6.—This area of Lagonda silty clay loam, 5 to 9 percent slopes, eroded, is used for milo. The forested area in the background is Greenton silty clay loam, bedrock substratum, 9 to 14 percent slopes, eroded.

"Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Moderately deep, well drained soils

Estimated percent of the map unit: 0 to 5 percent
Parent material: Loess and residuum derived from sandstone and sandy shales

36D2—Lamoni loam, 9 to 14 percent slopes, eroded

Map Unit Setting

Landform: Till plains

Component Description

Lamoni

Percent of the map unit: 95 percent
Position on the landform: Backslopes
Parent material: Loess over till
Slope shape: Concave

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Very high
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 12 to 36 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 7 inches; loam
2Btg1—7 to 37 inches; clay
2Btg2—37 to 60 inches; clay loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Moderately well drained soils

Estimated percent of the map unit: 0 to 2 percent
Parent material: Fresh glacial till

Poorly drained soils

Estimated percent of the map unit: 0 to 2 percent
Parent material: Clayey paleosol

Severely eroded areas

Estimated percent of the map unit: 0 to 1 percent

62D2—Caleb silt loam, 9 to 14 percent slopes, eroded

Map Unit Setting

Landform: Till plains

Component Description

Caleb

Percent of the map unit: 95 percent
Position on the landform: Toeslopes
Parent material: Alluvium
Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Medium
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: Moderate (3 to 6 percent)
Content of organic matter: Moderately low (1 to 2 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 36 to 60 inches
Drainage class: Moderately well drained

Typical Profile

Ap—0 to 3 inches; silt loam
A—3 to 8 inches; fine sandy loam
Bt1—8 to 13 inches; loam
Bt2—13 to 47 inches; clay loam
C—47 to 80 inches; sandy loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Somewhat poorly drained soils

Estimated percent of the map unit: 0 to 5 percent
Parent material: Loess
Slope range: 5 to 9 percent

70C2—Dawn loam, 5 to 9 percent slopes, eroded

Map Unit Setting

Landform: Till plains

Component Description

Dawn

Percent of the map unit: 100 percent
Position on the landform: Backslopes
Parent material: Residuum derived from sandstone and shale
Slope shape: Concave

Component Properties and Qualities

Depth to bedrock: Moderately deep (20 to 40 inches)
Runoff rate: Medium
Depth to restrictive feature: More than 37 inches to bedrock (paralithic)
Available water capacity: Low (3 to 6 inches)
Shrink-swell potential: Low (0 to 3 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: 18 to 36 inches
Drainage class: Moderately well drained

Typical Profile

Ap—0 to 11 inches; loam
Bw1—11 to 16 inches; loam
Bw2—16 to 24 inches; sandy loam
BC—24 to 37 inches; very fine sandy loam
Cr—37 to 60 inches; weathered bedrock

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

72F—Gosport silt loam, 14 to 35 percent slopes

Map Unit Setting

Landform: Till plains

Component Description

Gosport

Percent of the map unit: 90 percent
Position on the landform: Backslopes
Parent material: Residuum derived from shale
Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Moderately deep (20 to 40 inches)
Runoff rate: Very high
Depth to restrictive feature: More than 39 inches to bedrock (paralithic)
Available water capacity: Moderate (6 to 9 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: High (4 to 8 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: More than 6 feet
Drainage class: Moderately well drained

Typical Profile

A—0 to 6 inches; silt loam
E—6 to 9 inches; silt loam
Bw—9 to 33 inches; silty clay
C—33 to 39 inches; silt loam
Cr—39 to 60 inches; weathered bedrock

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Rock outcrop

Estimated percent of the map unit: 0 to 10 percent

73—Sandover loam, frequently flooded

Map Unit Setting

Landform: Flood plains in river valleys

Component Description

Sandover

Percent of the map unit: 95 percent
Parent material: Sandy alluvium over loamy alluvium
Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Negligible
Available water capacity: Low (3 to 6 inches)
Shrink-swell potential: Low (0 to 3 percent)
Content of organic matter: Moderately low (1 to 2 percent)

Component Hydrologic Properties

Flooding frequency: Frequent

Current depth to water table: 24 to 36 inches
Drainage class: Moderately well drained

Typical Profile

Ap—0 to 7 inches; loam
C—7 to 46 inches; sand
2Cg—46 to 60 inches; stratified silt loam to sand

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Soils that formed in silty alluvium

Estimated percent of the map unit: 0 to 5 percent

74—Dockery silt loam, frequently flooded

Map Unit Setting

Landform: Flood plains in river valleys

Component Description

Dockery

Percent of the map unit: 85 percent
Parent material: Alluvium
Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Negligible
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: Moderate (3 to 6 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding frequency: Frequent
Current depth to water table: 18 to 30 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 5 inches; silt loam
Cg1—5 to 28 inches; silt loam
Cg2—28 to 60 inches; silt loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Poorly drained soils

Estimated percent of the map unit: 0 to 3 percent
Landform: Flood plains

Very poorly drained soils

Estimated percent of the map unit: 0 to 3 percent
Parent material: Clayey alluvium

Carlow and similar soils

Estimated percent of the map unit: 0 to 3 percent

Poorly drained soils

Estimated percent of the map unit: 0 to 2 percent
Landform: Stream terraces and footslopes

Tice and similar soils

Estimated percent of the map unit: 0 to 2 percent

Zook and similar soils

Estimated percent of the map unit: 0 to 2 percent

78—Colo silt loam, occasionally flooded

Map Unit Setting

Landform: Flood plains in river valleys

Component Description

Colo

Percent of the map unit: 95 percent
Parent material: Alluvium
Slope shape: Linear

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Negligible
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: Moderate (3 to 6 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding frequency: Occasional
Current depth to water table: 0 to 12 inches
Drainage class: Poorly drained

Typical Profile

Ap—0 to 4 inches; silt loam
A—4 to 22 inches; silt loam
Bg—22 to 44 inches; silty clay loam
BCg—44 to 60 inches; silty clay loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Somewhat poorly drained soils

Percent of the map unit: 0 to 5 percent
Parent material: Silty alluvium
Landform: High flood plains, toeslopes, alluvial fans

80—Tice silt loam, overwash, frequently flooded

Map Unit Setting

Landform: Flood-plain steps in river valleys

Component Description

Tice

Percent of the map unit: 85 percent
Parent material: Silty alluvium
Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Negligible
Available water capacity: Very high (more than 12 inches)
Shrink-swell potential: Moderate (3 to 6 percent)
Content of organic matter: Moderately low (1 to 2 percent)

Component Hydrologic Properties

Flooding frequency: Frequent
Current depth to water table: 12 to 24 inches
Drainage class: Somewhat poorly drained

Typical Profile

A—0 to 5 inches; silt loam
Apb—5 to 22 inches; silty clay loam
Bw—22 to 54 inches; silt loam
Cg—54 to 75 inches; silt loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Moderately well drained or well drained soils

Estimated percent of the map unit: 0 to 8 percent
Parent material: Loamy to sandy alluvium

Poorly drained soils

Estimated percent of the map unit: 0 to 7 percent
Parent material: Moderately fine textured alluvium

81—Tice silty clay, overwash, occasionally flooded

Map Unit Setting

Landform: Flood-plain steps in river valleys

Component Description

Tice

Percent of the map unit: 95 percent
Parent material: Silty alluvium
Slope shape: Convex

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Negligible
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: Moderate (3 to 6 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding frequency: Occasional
Current depth to water table: 12 to 24 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 4 inches; silty clay
A—4 to 16 inches; silty clay loam
Bw—16 to 60 inches; silt loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Carlow and similar soils

Percent of the map unit: 0 to 5 percent

82A—Triplett silt loam, 1 to 3 percent slopes, rarely flooded

Map Unit Setting

Landform: Stream terraces in river valleys

Component Description

Triplett

Percent of the map unit: 90 percent

Parent material: Loess over alluvium
Slope shape: Linear

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: High
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: Moderate (3 to 6 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding frequency: Rare
Current depth to water table: 6 to 18 inches
Drainage class: Somewhat poorly drained

Typical Profile

Ap—0 to 8 inches; silt loam
E—8 to 16 inches; silt loam
Bt—16 to 29 inches; silty clay
Btg—29 to 45 inches; silty clay
2BCg—45 to 70 inches; silty clay loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Moderately well drained soils

Estimated percent of the map unit: 0 to 5 percent

Fine textured soils

Estimated percent of the map unit: 0 to 5 percent
Parent material: Silty sediments and alluvium

84—Vesser silt loam, occasionally flooded

Map Unit Setting

Landform: Flood-plain steps in river valleys

Component Description

Vesser

Percent of the map unit: 90 percent
Parent material: Alluvium
Slope shape: Concave

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Negligible
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: Moderate (3 to 6 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding frequency: Occasional
Current depth to water table: 0 to 12 inches
Drainage class: Poorly drained

Typical Profile

Ap—0 to 14 inches; silt loam
E—14 to 33 inches; silt loam
Btg—33 to 60 inches; silty clay loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Fine textured soils that do not have a light-colored subsurface layer

Estimated percent of the map unit: 0 to 4 percent

Dockery and similar soils

Estimated percent of the map unit: 0 to 3 percent

Soils that have a thinner dark surface layer than that of the Vesser soil

Estimated percent of the map unit: 0 to 3 percent

92—Carlow silty clay, frequently flooded

Map Unit Setting

Landform: Flood plains in river valleys

Component Description

Carlow

Percent of the map unit: 90 percent
Parent material: Alluvium
Slope shape: Linear

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Negligible
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding frequency: Frequent
Current depth to water table: 0 to 12 inches
Drainage class: Poorly drained

Typical Profile

Ap—0 to 11 inches; silty clay

Bg1—11 to 17 inches; silty clay loam
Bg2—17 to 60 inches; clay
Bg3—60 to 80 inches; clay loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Tice and similar soils

Estimated percent of the map unit: 0 to 3 percent

Dockery and similar soils

Estimated percent of the map unit: 0 to 3 percent

Carlow soils that are subject to ponding

Estimated percent of the map unit: 0 to 2 percent

Areas that are frequently flooded

Estimated percent of the map unit: 0 to 2 percent

94—Zook silty clay loam, overwash, frequently flooded

Map Unit Setting

Landform: Flood plains in river valleys

Component Description

Zook

Percent of the map unit: 97 percent
Parent material: Alluvium
Slope shape: Linear

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Medium
Available water capacity: High (9 to 12 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Moderately low (1 to 2 percent)

Component Hydrologic Properties

Flooding frequency: Frequent
Current depth to water table: 0 to 12 inches
Drainage class: Poorly drained

Typical Profile

A1—0 to 4 inches; silty clay loam
A2—4 to 46 inches; silty clay
Bg—46 to 60 inches; silty clay loam

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Soils that have a thick, light-colored subsurface layer

Estimated percent of the map unit: 0 to 3 percent
Parent material: Silty alluvium

98—Wabash silty clay, frequently flooded

Map Unit Setting

Landform: Flood plains in river valleys

Component Description

Wabash

Percent of the map unit: 97 percent
Parent material: Alluvium
Slope shape: Linear

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Negligible
Available water capacity: Moderate (6 to 9 inches)
Shrink-swell potential: Very high (9 to 25 percent)
Content of organic matter: Moderate (2 to 4 percent)

Component Hydrologic Properties

Flooding frequency: Frequent
Current depth to water table: 6 to 12 inches
Drainage class: Poorly drained

Typical Profile

A—0 to 26 inches; silty clay
Bg—26 to 80 inches; silty clay

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Minor Components

Soils that are subject to ponding

Estimated percent of the map unit: 0 to 3 percent

99F—Putco-Pits-Dumps complex, 9 to 50 percent slopes

Map Unit Setting

Landform: Till plains

Component Description

Putco

Percent of the map unit: 73 percent
Parent material: Mine spoil or earthy fill

Component Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff rate: Very high
Available water capacity: Moderate (6 to 9 inches)
Shrink-swell potential: High (6 to 9 percent)
Content of organic matter: Low (0.5 to 1.0 percent)

Component Hydrologic Properties

Flooding: None
Current depth to water table: More than 6 feet
Drainage class: Well drained

Typical Profile

A—0 to 4 inches; silty clay
C—4 to 80 inches; channery silty clay

Detailed profile descriptions are given in the "Classification of the Soils" section. Additional information is provided in the tables described under the heading "Soil Properties."

Pits

Percent of the map unit: 22 percent
• This component consists of open pits from which limestone has been removed.

Dumps

Percent of the map unit: 5 percent
• This component consists of unreclaimed areas of discarded mine spoil and earthfill derived from limestone and shale.

99002—Orthents, borrow areas, clayey

Component Description

• This map unit consists of excavated areas from which soil material has been removed for a variety of uses.

99005—Orthents, landfill

Component Description

• This map unit consists of areas used as sanitary landfills. The landfills are either completed or in progress, and the soils are either reclaimed or in the process of being reclaimed.

M-W—Miscellaneous water

Component Description

• This map unit consists of small manmade areas that are used primarily for water treatment applications.

W—Water

Component Description

• This map unit consists of naturally occurring basins of surface water, such as perennial rivers and creeks. It also includes manmade lakes and ponds that are larger than 5 acres.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various land uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited or not limited by all of the soil features that affect a specified use. Terms for the limitation classes are ***not limited, slightly limited, moderately limited, limited,*** and ***very limited.*** In certain tables the soils are rated as ***improbable, possible,*** or ***probable*** sources of specific materials used for construction purposes.

Numerical Ratings

Numerical ratings in the tables indicate the severity of individual limitations. They also indicate the overall degree to which a soil is limited or not limited for a specific use. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

In tables that use limitation class terms, such as ***very limited*** or ***limited,*** the limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each map unit component. The overall limitation rating for the component is based on the most severe limitation.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. Prime farmland is described, the estimated yields of the main crops and pasture plants are listed, and the system of land capability classification used by the Natural Resources Conservation Service is explained.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

The soils in Livingston County have good potential for sustained production of food. Crops are harvested from about 230,000 acres in the county. However, not all of the cropland and pastureland in Livingston County is adequately managed to meet conservation needs. Cropland that is not adequately treated is mostly in upland areas that are being farmed in a manner that results in excessive water erosion. Some of the marginal cropland used for row crops should be converted to pasture and hayland. Erosion on most of the cropland can be held to a tolerable level by using a system of conservation practices designed for specific sites.

The loss of cropland resulting from highway construction and urban development has been slight in Livingston County. It is primarily limited to the Chillicothe area and areas along Highways 36 and 65.

The primary soil management concern in all areas that have slopes of more than 2 percent is water erosion. Areas that are used for row crops or are overgrazed are particularly susceptible. Soils that have slopes of less than 2 percent have other limitations, resulting from wetness, that affect some agricultural uses.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Grundy, Greenton, Lagonda, and Lamoni soils. Water erosion also reduces the productivity of soils that tend to be droughty because they have bedrock within a depth of 40 inches. Locksprings soils are examples. Second, water erosion on farmland results in the sedimentation of streams, lakes, and ponds. Controlling water erosion minimizes the pollution of streams by sediment and improves the quality of water for municipal and recreational uses and for fish and other wildlife. It also prolongs the useful life of ponds and lakes by preventing them from filling with sediment.

Seedbed preparation and tillage are difficult in areas where the clayey subsoil has been exposed by erosion. These areas occur in Greenton, Grundy, Lagonda, and Lamoni soils.

Erosion-control practices provide a protective surface cover, reduce the runoff rate, and increase the rate of water infiltration. Using a cropping system that keeps a cover of vegetation or crop residue on the soil can hold erosion losses to a minimum without reducing the productive capacity of the soils. Growing grasses and legumes for pasture and hay is effective in controlling erosion. Using legumes, such as clover and alfalfa, in the crop rotation improves tilth and provides nitrogen for the subsequent crop.

Terraces reduce the length of slopes. They also reduce the runoff rate and the hazard of erosion. Conventional broad-base terraces are most practical in areas of upland soils that are not eroded and that have long, smooth, gently sloping and moderately sloping side slopes. Special construction and management techniques are necessary if terrace systems are installed in most of the strongly sloping areas of Caleb, Lamoni, and Greenton soils. Construction of narrow-base terraces reduces the steepness of the slope in these areas. Construction of conventional terraces, however, actually increases the slope and makes additional erosion-control practices crucial. In these areas, cropping systems that provide substantial vegetative cover are needed to control erosion unless conservation tillage is practiced and large amounts of residue are used. Soil loss in moderately steep areas of Lagonda and Greenton soils is severe if these soils are cultivated for row crops. Minimizing tillage on sloping soils and leaving large quantities of crop residue on the surface increase the rate of water infiltration and reduce the runoff rate and the hazard of water erosion. These practices can be adapted to many of the soils in the survey area, but they are less likely to be successful in areas of eroded soils that have a clayey surface layer. Special management techniques may be required in areas of Greenton, Grundy, Lagonda, and Lamoni soils where the clayey subsoil is exposed.

Soil fertility is relatively low in most of the eroded soils and most of the moderately deep soils in the survey area. All soils, however, require additional plant nutrients for optimum production. Most soils in the survey area are moderately acid or slightly acid in the upper part of the root zone. In these soils, applications of agricultural lime are needed for optimum growth of

cultivated crops and pasture. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to be applied.

Soil tilth is an important factor affecting the germination of seeds and the infiltration of water into the soil. Returning crop residue to the soil or regularly adding other organic material improves soil tilth.

Most of the upland soils in the survey area have a dark surface layer of silt loam or silty clay loam that has a medium or high content of organic matter. Generally, the structure of these soils becomes weaker as a result of tillage and compaction. Intense rainfall can cause crusting of the surface. The crust is hard when dry. It reduces the rate of water infiltration and increases the runoff rate. Regular additions of crop residue, manure, and other organic material can improve soil structure and tilth. Fall tillage is common in the survey area but is a poor conservation practice on most upland soils. Most of the cropland in the uplands is in areas of sloping soils that are subject to further erosion if they are tilled in the fall.

Tilth is a problem in areas of the clayey Zook, Wabash, and Carlow soils because these soils often stay wet until late in the spring. If they are tilled when wet, they tend to become cloddy. The cloddiness makes preparing a seedbed difficult. Tilling Carlow, Wabash, and Zook soils in the fall generally helps to prevent the deterioration of tilth.

The cultivated crops most commonly grown in the county are corn (fig. 7), soybeans, grain sorghum, and small grain. Winter wheat is the most common small grain crop, but oats are also grown. Double-cropping is an alternative cropping system. For example, soybeans can be planted directly into wheat stubble. Maintaining a large amount of residue on the surface helps to protect the soil from water erosion. Limitations that can affect double-cropping include inadequate soil moisture and inadequate time for soybean maturation before frost.

Pasture and hay crops suited to Livingston County include several legumes, cool-season grasses, and warm-season native grasses (fig. 8). Alfalfa and red clover are the common legumes grown for hay. They are also used in mixtures with bromegrass, orchardgrass, fescue, or timothy for hay and pasture. Birdsfoot trefoil is used in mixtures that include bromegrass, orchardgrass, fescue, and bluegrass for pasture.

Warm-season native grasses adapted to the survey area are big bluestem, little bluestem, indiangrass, and switchgrass. These grasses grow well during the hot summer months. Warm-season grasses require different management techniques for establishment and grazing than cool-season grasses.

Alfalfa is best suited to deep, moderately well drained soils, such as Weller and Chillicothe soils. Other legumes and all grasses grow well on most of the upland soils in the survey area. The bottom-land soils in the survey area that are subject to occasional flooding and that stay wet for long periods are not suited to some grasses. Examples are Carlow, Wabash, and Zook soils. These soils are better suited to short-season summer annuals than to grasses.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 178,746 acres in the survey area, or 52 percent of the total acreage, meets the soil requirements for prime farmland.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Figure 7.—Corn shocks in an area of Lagonda silty clay loam, 2 to 5 percent slopes, eroded.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. Some of the soil qualities and properties that affect use and management are described under the heading "Detailed Soil Map Units."

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forestland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA, 1961). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, forestland, or wildlife habitat.

Figure 8.—Dairy cattle in a pastured area of Lagonda silty clay loam, 5 to 9 percent slopes, eroded. The forested area in the background is Locksprings silty clay loam, 9 to 30 percent slopes.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, ***e, w, s,*** or ***c,*** to the class numeral, for example, 2e. The letter ***e*** shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; ***w*** shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); ***s*** shows that the soil is limited mainly because it is shallow, droughty, or stony; and ***c,*** used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by ***w, s,*** or ***c*** because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, forestland, wildlife habitat, or recreation.

The capability classification of map units in this survey area is given in table 6.

Pasture and Hayland Suitability Groups

The soils in Livingston County are assigned to a pasture and hayland group according to their suitability for pasture management.

Many different pasture and hayland suitability groups are in the survey area. Over time, the combination of plants best suited to a particular soil and climate has or will become dominant. Plant communities are not static but vary slightly from year to year and from place to place.

The relationship between soils and vegetation was ascertained during this survey. Thus, pasture and hayland suitability groups generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of each plant species. Soil reaction, salt content, and a seasonal high water table also are important. The "Field Office Technical Guide," which is available at local offices of the Natural Resources Conservation Service, can provide specific information about pasture and hayland suitability groups.

Table 7 shows, for each soil, the assigned pasture and hayland suitability group. Specific concerns and recommendations for pasture and hayland management for each group are described in the following paragraphs.

Group WLB—Wet Loamy Bottom. A seasonal high water table and flooding are the main management concerns. Plants should be selected accordingly. A seedbed can be easily prepared. A drainage system can improve the growth of deep-rooted species. The hazard of flooding should be considered when a grazing system is designed.

Group WCB—Wet Clayey Bottom. Wetness and flooding are the main management concerns. The soils in this group are poorly suited to hay. The hazard of flooding should be considered when a grazing system is designed. Maintaining stands of desirable species is difficult in depressional areas. A drainage system can improve the growth of deep-rooted species.

Group WCU—Wet Clayey Upland. Wetness is the main management concern. Maintaining stands of desirable species is difficult in depressional areas. A drainage system can improve the growth of deep-rooted species.

Group WLO—Wet Loamy Overflow. Wetness and flooding are the main management concerns. A seedbed can be easily prepared. A drainage system can improve the growth of deep-rooted species. The hazard of flooding should be considered when a grazing system is designed.

Group LyO—Loamy Overflow. Flooding is the main management concern. The hazard of flooding should be considered when a grazing system is designed.

Group LyU—Loamy Upland. No serious concerns affect pasture and hayland management. Erosion is a hazard in newly seeded areas. Timely seedbed preparation is needed to ensure a good ground cover.

Group CyU—Clayey Upland. Pasture and hay crops are effective in controlling erosion. Erosion during seedbed preparation is the main concern. Timely tillage and a quickly established ground cover reduce the hazard of erosion. The forage species that are tolerant of wetness grow best. The production of deep-rooted legumes is limited because of wetness and a restricted rooting depth.

Group GrU—Gravelly Upland. The soils in this group generally are not suited to cultivated crops. Droughtiness and erosion are the main management concerns. Seedbeds should be prepared on the

contour. Timely seedbed preparation helps to ensure rapid plant growth and a protective ground cover.

Group MDU—Moderately Deep Upland. Shallow-rooted species that are tolerant of droughtiness should be selected for planting. Erosion is a serious hazard in newly seeded areas. Timely tillage and a quickly established ground cover reduce the hazard of erosion.

Group WtP—Wet Pan. The species that are tolerant of wetness grow best. A dense layer in the subsoil can restrict the rooting depth and result in insufficient soil moisture in dry years. Erosion during seedbed preparation is the main concern. Timely tillage and a quickly established ground cover reduce the hazard of erosion.

Group LyP—Loamy Pan. A few small areas of this group are used for cultivated crops, and some areas are wooded. A dense layer in the subsoil can restrict the rooting depth and result in insufficient soil moisture in dry years. Erosion during seedbed preparation is a hazard. Seedbeds should be prepared on the contour. Timely tillage and a quickly established ground cover reduce the hazard of erosion.

Group GrO—Gravelly Overflow. Most areas of this group have been cleared of trees and are used for pasture and hay. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during periods of flooding help to keep the pasture in good condition.

Group GrP—Gravelly Pan. If the soils in this group are used for improved pasture, chert on the surface hinders tillage. Because of seasonal droughtiness, timely planting is needed to ensure an adequate stand. Erosion is a hazard in newly seeded areas. Timely seedbed preparation helps to ensure a protective ground cover.

Group ShU—Shallow Upland. Most areas of this group are used for native pasture and are best suited to shallow-rooted species. In some areas tillage is nearly impossible. Broadcast seeding may be necessary. The slope and rock outcrop can hinder mowing in places.

Group SyO—Sandy Overflow. The soils in this group tend to be droughty because they are excessively drained, but they are also subject to flooding. Plants should be selected accordingly. A seedbed can be easily prepared. The flooding and the droughtiness should be considered when a grazing system is designed. Because the soils are subject to flooding and droughtiness at different times, a flexible grazing system is needed.

Group GNS—Generally Not Suited. The soils in this group generally are not suited to pasture and hay. The suitability for forage species and the use of equipment are limited by the slope, a high content of rock fragments, or both.

Forest Productivity and Management

Douglas C. Wallace, forester, Natural Resources Conservation Service, helped prepare this section.

Approximately 23,410 acres in Livingston County, or about 7 percent of the survey area, is forested, according to 1986 woodland survey estimates by the Missouri Department of Conservation. Upland woodland tracts in the county are primarily small, irregular, private holdings of 10 to 50 acres and are essentially unmanaged (Geissman and others, 1986). In areas on the flood plains, forests are restricted to long narrow bands bordering streams and rivers.

Tree species and growth rates in the county vary, depending on ***soil properties, site characteristics,*** and past ***management activities.***

Soil properties that affect the growth of trees include reaction (pH), fertility, drainage, texture, structure, and soil depth. The soil also serves as a reservoir for moisture, provides an anchor for roots, and supplies essential plant nutrients. Soils that do not have extremes of these properties and have an effective rooting depth of more than 40 inches allow the best growth for wood production.

Site characteristics that affect tree growth include aspect, slope, and topographic position. These site characteristics influence the amount of available sunlight, air drainage, soil temperature, soil moisture, and relative humidity. Typically, north and east aspects and the lower slope positions, which are cooler and have better moisture conditions than other sites, are the best upland sites for tree growth. The most productive soils on bottom land are generally areas of deep, moderately well drained, occasionally flooded soils.

Management activities can influence woodland productivity and should be aimed at eliminating factors causing tree stress. Generally, these activities include thinning overstocked young stands; harvesting old, mature trees; eliminating destructive fire; and preventing grazing. Fire and grazing have very negative impacts on forest growth and quality. Although forest fires are no longer a major problem in the county, about 50 percent of the woodland is still subject to grazing. Grazing destroys the leaf layer on the surface, compacts the soil, and destroys or damages tree seedlings. Woodland sites that are protected from livestock and fire have the highest potential for optimum timber production.

Gosport, Locksprings, and Greenton soils are associated with the largest acreage of upland forests (fig. 9). Typical species include post oak, black oak, and shagbark hickory. Undisturbed areas of Greenton soils are the most productive.

Along the major watercourses, Wabash, Zook, Carlow, Tice, and Dockery soils support bottom-land hardwoods adapted to saturated or flooded soil conditions. Many areas of these soils have been cleared for crop production. The remaining wooded sites typically support silver maple, hackberry, American elm, swamp white oak, sycamore, cottonwood, pecan, and pin oak. Bur oak, shellbark hickory, and walnut are common on bottom land along the smaller streams and on the higher terraces along the major streams. These sites have a high potential for excellent forest growth.

Special-use tree plantings (Christmas trees, nut trees, and fuelwood trees) can be successful if adapted species are used. Christmas tree plantings can be established on any soil that is not poorly drained or very poorly drained. Suitable tree species in Livingston County include Scotch pine, Austrian pine, white pine, and Douglas-fir. Nut trees, such as eastern black walnut and native pecan, can be grown in the survey area. Black walnut is best suited to deep, loamy soils on bottom land, such as Sandover and Triplett soils. Pecan trees should only be planted in somewhat poorly drained areas on bottom land that are subject to occasional or frequent flooding. Other soils are also suited but may be less productive. Planting trees for fuelwood is also feasible in Livingston County if fast-growing trees are used. The species that are most suitable for this purpose are green ash, black locust, sycamore, and silver maple.

The tables described in this section can help forest owners or managers plan the use of soils for wood crops. They show the potential productivity of the soils for wood crops and rate the soils according to the limitations that affect various aspects of forest management.

Forest Productivity

In table 8, the ***potential productivity*** of merchantable or ***common trees*** on a soil is expressed as a site index and as a volume number. The ***site index*** is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forest managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or through the Agency's Website.

The ***volume of wood fiber***, a number, is the yield likely to be produced by the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Trees to manage are those that are preferred for planting, seeding, or natural regeneration and those that remain in the stand after thinning or partial harvest.

Forest Management

In tables 9a and 9b, interpretive ratings are given for various aspects of forest management. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified aspect of forest management. ***Not limited*** indicates that the soil has features that are very favorable for the specified aspect of management. Good performance and very low maintenance can be expected. ***Slightly limited*** indicates that the soil has features that are favorable for the specified aspect of management. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. ***Moderately limited*** indicates that the soil has features that are moderately favorable for the specified aspect of management. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. ***Limited*** indicates that the soil has one or more features that are significant limitations for the specified aspect of management. The limitations can be overcome, but overcoming them generally requires special design, special planning, soil reclamation, specialized equipment, or other procedures that may result in additional expense. Fair performance and moderate or high maintenance can be expected. ***Very limited*** indicates that the soil has one or more features that are unfavorable for the specified aspect of management. The limitations generally cannot be overcome without major soil reclamation, special design, specialized equipment, or other expensive procedures. Poor performance, unsafe conditions, or high maintenance can be expected.

Figure 9.—Trees can provide a cash crop. These trees are in an area of Locksprings soils.

Numerical ratings in the tables indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation class for the component is based on the most severe limitation.

The paragraphs that follow indicate the soil properties considered in rating the soils for forest management factors. More detailed information about the criteria used in the ratings is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or through the Agency's Website.

Ratings in the column ***hand planting*** are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. Ratings indicate the expected difficulty of hand planting, which includes the proper placement of root systems of tree seedlings to a depth of up to 12 inches, using standard hand planting tools. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column ***mechanical planting*** are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. Ratings indicate the expected difficulty in using a mechanical planter, which includes proper placement of root systems of tree seedlings to a depth of up to 12

inches. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column ***use of harvesting equipment*** are based on slope, rock fragments on the surface, plasticity index, content of sand, surface texture, depth to a water table, and ponding. Ratings indicate the suitability for operating harvesting equipment for off-road transport or harvest of logs and/or wood products by ground-based wheeled or tracked equipment.

Ratings in the column ***mechanical site preparation (surface)*** are based on slope, depth to a restrictive layer, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The part of the soil from the surface to a depth of about 12 inches is considered in the ratings. Ratings indicate the suitability of using surface-altering soil tillage equipment to prepare the site for planting or seeding.

Ratings in the column ***roads (natural surface)*** are based on slope, rock fragments on the surface, plasticity index, content of sand, surface texture, depth to a water table, ponding, flooding, and the hazard of soil slippage. The ratings indicate the suitability for using the natural surface of the soil for roads on which trucks transport logs and other wood products from the site.

In table 9b, ratings in the column ***erosion on roads and trails*** are based on the soil erodibility factor K, slope, and content of rock fragments. The ratings apply to unsurfaced roads and trails.

Ratings in the column ***off-road or off-trail erosion*** are based on slope and on the soil erodibility factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance.

Ratings in the column ***soil rutting*** are based on depth to a water table, rock fragments on or below the surface, surface texture, depth to a restrictive layer, and slope. Ruts form as a result of the operation of forest equipment. Ratings indicate limitations affecting the hazard or risk of ruts in the uppermost layers of the soil. Soil displacement and puddling (soil deformation and compaction) may occur simultaneously with the formation of ruts.

Ratings in the column ***log landings*** are based on slope, rock fragments on the surface, plasticity index, content of sand, surface texture, depth to a water table, ponding, flooding, and the hazard of soil slippage. Ratings indicate the suitability of the soil at the forest site to serve as a log landing and to allow the efficient and effective use of equipment for the temporary storage and handling of logs.

Ratings in the column ***seedling survival*** are based on flooding, ponding, depth to a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope. Ratings indicate the impact of soil, physiographic, and climatic conditions on the survivability of newly established tree seedlings.

Windbreaks and Environmental Plantings

Douglas C. Wallace, forester, Natural Resources Conservation Service, helped prepare this section.

Living plants play an important role in supporting our life and improving its condition. If properly used and maintained, plants can help provide positive solutions to many problems in our contemporary environment. In Livingston County, windbreaks and environmental plantings can be utilized throughout the landscape to meet a variety of engineering, climatological, and esthetic needs.

Windbreaks can be grown successfully in many areas of Livingston County. Several specific aspects of management should be considered when farmstead and field windbreaks are planned. These include design and layout; species selection; site preparation; seedling handling; weed management; supplemental watering; and protection from diseases, insects, and livestock.

Farmstead windbreaks make the farmstead area a more comfortable place, reduce energy costs, increase garden and fruit tree yields, enhance wildlife populations, buffer noises, and raise property values (Scholten, 1988). Feedlot windbreaks can be used to protect livestock from wind and snow. Windbreaks significantly reduce calf losses, make feeding operations easier, and enable livestock to maintain better weight with less feed.

Farmstead and feedlot windbreaks are generally two or more rows wide, and at least two of the rows consist of an evergreen species. The windbreaks should be established on the windward side of the area to be protected and as perpendicular as possible to the prevailing winds. Well designed farmstead and feedlot windbreaks are needed throughout Livingston County, especially in the open, former prairie areas of the Lagonda, Grundy, Lamoni, and Crestmeade soils.

Field windbreaks or shelterbelts are designed to protect field crops and bare soil from the effects of strong winds. Field windbreaks minimize soil losses, increase crop yields, retard the spread of weeds between fields, and enhance wildlife habitat (Brandle and others, 1988). They should be carefully planned.

Field boundaries, irrigation systems, power lines, and roads should be considered when the location of field windbreaks is determined. Windbreaks should be oriented at a right angle to the prevailing winds. The typical field windbreak system consists of a series of single rows of trees or shrubs. Field windbreaks are adaptable to many locations throughout the county but would be most beneficial in areas of the Lagonda and Greenton-Lagonda associations, which are described under the heading "General Soil Map Units."

Environmental plantings can be used for beautification, visual screens, and control of acoustical, pollution, and climatological problems around buildings and other living spaces. Care should be given to selecting plants that exhibit proper height, shape, form, color, and texture and that are compatible with the surrounding area, structures, and desired use (Robinette, 1972). Establishing trees and shrubs is relatively easy in most areas of Livingston County, but adequate site preparation prior to planting and control of competition from weeds after planting are necessary.

Table 10 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in the table are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Natural Resources Conservation Service or of the Cooperative Extension Service or from a commercial nursery.

Recreation

The soils of the survey area are rated in table 11 according to limitations that affect their suitability for recreational uses. Soils are rated for camp areas, picnic areas, playgrounds, and paths and trails.

The ratings in the table are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect recreational site development. ***Not limited*** indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. ***Slightly limited*** indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. ***Moderately limited*** indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. ***Limited*** indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but overcoming them generally requires special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate or high maintenance can be expected. ***Very limited*** indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation rating for the component is based on the most severe limitation.

The information in table 11 can be supplemented by other information in this survey, for example, interpretations for building site development,

construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, a water table, ponding, flooding, slope, and texture of the surface layer. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to frequent flooding during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Wildlife Habitat

John Mack Ellis, biologist, Missouri Department of Conservation, helped prepare this section.

Livingston County is one of 11 counties in north-central Missouri that make up the Northern River Breaks Zoogeographic Region (Nagel, 1970). The most remarkable feature of this region is the great diversity of cover types, which results from a wide array of landforms. These landforms include gently rolling uplands; loess-covered, high flood plains; and broad areas of bottom land along rivers. Some upland sites resemble the Ozarks in topography and forest cover. Streams that contribute to the rich wetland and riparian diversity of the county include the Grand and Thompson Rivers and Shoal, Medicine, and Muddy Creeks. These southward-flowing streams and associated bottom-land lakes, oxbows, marshes, and timbered riparian corridors once contributed to great numbers of wintering and migratory waterfowl and shore birds. Leveeing, channelization, and agricultural expansion activities have reduced wetland wildlife resources to about 10 percent of their presettlement size.

Presettlement surveys by the U.S. General Land Office indicated that 57 percent of Livingston County was covered by prairie (Schroeder, 1982). Prairies of the region existed in narrow ridges as a result of closely spaced, somewhat parallel streams and the associated wooded stream valleys. The fact that prairie and woods exist in close association was pointed out by a land office survey account of the Blue Mound area in southern Livingston County. According to this account, “Blue Mound was timbered on the eastern slopes, barrens on the western slopes, and a grassland prairie on the south and southwest slopes” (Schroeder, 1982).

Bottom-land prairies occurred on the flood plains along the Grand and Thompson Rivers. In some places, wet bottom-land prairie was so extensive that the bottom-land timber grew only in areas adjacent to streambanks. These wet prairies were composed of dense stands of cordgrass (ripgut) interspersed with

rice cutgrass, bluejoint grass, switchgrass, sedges, and numerous wet prairie forbs, including southern blue flag. Early historical accounts reported good populations of deer, turkey, buffalo, bear, wolf, white pelican, golden plover, sandhill crane, elk, grouse, prairie chicken, and rattlesnake (Schroeder, 1982).

Approximately 187 species of fish and wildlife seasonally or permanently reside in Livingston County, and an additional 150 species are listed as "likely to occur" (Missouri Department of Conservation, 1981). Typical nongame species include killdeer, barred owl, red-tailed hawk, ovenbird, red-headed woodpecker, eastern kingbird, loggerhead shrike, tufted titmouse, great blue heron, belted kingfisher, eastern meadowlark, American goldfinch, northern cardinal, red-winged blackbird, northern water snake, black rat snake, and common snapping turtle. The most common wildlife game species include white-tailed deer, eastern wild turkey, bobwhite quail, fox squirrel, gray squirrel, eastern cottontail rabbit, raccoon, wood duck, mallard, northern pintail, and Canada goose.

Seventeen State or Federal rare and endangered species are known to inhabit Livingston County or are "likely to occur" (Missouri Department of Conservation, 1981). These include the bald eagle, great egret, black-crowned night heron, little blue heron, Indiana bat, and barn owl. A few American bitterns and pied-billed grebes remain in the area, despite the almost entire loss of their native prairie habitat.

The furbearer population in Livingston County is good and includes all of the species that are typical of northern Missouri. Raccoon, opossum, muskrat, coyote, beaver, and striped skunk are the commonly sought-after species. Most of these species are restricted to the remaining areas of suitable habitat. Depressed international fur markets have resulted in reduced furbearer harvests in recent years.

Since the formation of the Missouri Department of Conservation in 1937, many wildlife species have been or currently are being restored to their original ranges. Livingston County has been the benefactor of many of these successful restoration efforts. Total annual county harvests of 2,103 deer and 540 turkey in 1994 are testimony to the success of these early reintroductions. The January 1995 midwinter eagle survey counted 2,394 bald eagles in Missouri, many of which migrated through Livingston County. More than 100 eagles regularly concentrate near Fountain Grove Conservation Area and Swan Lake National Wildlife Refuge each winter.

The first otters to be reintroduced into Missouri were released at Swan Lake National Wildlife Refuge in 1982. The great diversity and high quality of wetland habitat that remains in that area result in ideal habitat conditions for otters. Since 1982, hundreds of otters have been released in suitable habitats throughout the Grand River system. Throughout the period from 1983 to 1994, more than 1,000 otter sightings or incidents have been recorded.

Significant efforts have been made to restore ruffed grouse numbers in Missouri. Since 1978, 3,868 grouse have been released on 63 sites in 33 counties (Kurzejeski and others, 1987). One of those releases took place near the confluence of the Thompson and Grand Rivers. The future for ruffed grouse is promising only in areas where long-term timber management or habitat improvement plans exist.

The Chinese ring-necked pheasant should be the next successful species to be established in Livingston County. Annual roadside surveys indicate that pheasant numbers are increasing as a result of Conservation Department stockings in adjoining counties and southern expansion of existing populations. These releases were part of a plan to expand the pheasant range in northern Missouri using wild birds. Landowners interested in improving pheasant nesting cover should establish grasses, such as orchardgrass and brome or native warm-season grasses.

Wetland bottom-land habitat remaining in Livingston County is in areas of the Carlow-Dockery association, which is described under the heading "General Soil Map Units." This association is adjacent to the Grand and Thompson Rivers and in areas of bottom land along Shoal Creek and Medicine Creek. The highest quality and most diverse wetlands remain near Fountain Grove Conservation Area. More than 130 species of migratory birds and waterfowl rest and feed in these wetlands during their spring and fall migration. In addition to serving as a valuable stopover for Mississippi Flyway ducks, these wetlands are also noted for wintering populations of Canada geese of the Eastern Prairie population. In 1941, only a few hundred geese visited the county; presently, however, more than 40,000 geese winter here each year. One active great blue heron rookery is known to exist in areas of this association (Missouri Department of Conservation, 1981). For successful nesting, great blue herons require tall trees in areas of bottom land.

Areas of the Lagonda association provide most of the openland wildlife habitat in the county. Woods, waterways, hedgerows, fence rows, and other woody or brushy areas provide the edge effect essential for the 80 species of openland wildlife common in the

survey area. These "hardcover" areas have been drastically reduced in parts of the county that are used intensively for agricultural purposes. Typical openland species include bobwhite quail, cottontail rabbit, eastern meadowlark, brown-headed cowbird, brown thrasher, cardinal, and mourning dove.

The bobwhite quail is one of the most sought-after game species in the survey area. Numbers of this species fluctuate greatly from year to year because of extreme winter weather and a lack of woody cover and of quality nesting areas. The habitat for bobwhite quail can benefit from most soil conservation practices, which reduce the hazard of erosion by employing native warm-season grasses, field borders, windbreaks, waterways, conservation tillage, and crop rotations.

The soils in the Locksprings-Greenton and Carlow-Dockery associations support most of the forestland and other wooded areas. Common woodland wildlife species include white-tailed deer, turkey, raccoon, wood duck, red-headed woodpecker, white-breasted nuthatch, short-tailed shrew, gray squirrel, fox squirrel, barred owl, bluejay, and woodcock. Good populations of deer, turkeys, and squirrels exist in the county. Gray squirrels dominate the bottom-land timber areas, and fox squirrels are mainly in the uplands, on farm woodlots, and in wooded draws.

Most wildlife habitat in the county is controlled by private landowners. Obtaining access for deer hunting may become easier in the future as landowners become more aware of the value of hunting as a means of deer management. The Missouri Department of Conservation manages two public wildlife areas in the county. Fountain Grove Conservation Area is 6,714 acres of wetlands and bottom-land forests and provides opportunities for observation and hunting of waterfowl and woodland wildlife. Poosey Conservation Area, in northwest Livingston County, is 5,100 acres of heavily timbered upland forests, old fields, and grassland.

More than 37 species of game and nongame fish have been documented as inhabiting the rivers and lakes of Livingston County (Missouri Department of Conservation, 1981). Rivers and streams offer the major fishing opportunities. Anglers catch good numbers of flathead and channel catfish, carp, drum, bullheads, and some sunfish. The major fishing streams are the Grand and Thompson Rivers. Locust, Medicine, and Shoal Creeks also provide seasonal stream fishing opportunities. Livingston County has about 212 miles of permanent flowing streams (Plymell, 1995). Stream fish populations and fishing opportunities on streams in north-central Missouri have been dramatically reduced as a result of channelization. This channelization has been the most evident on the Grand and Thompson Rivers. The channel length of the Grand River has been shortened from 241 miles to 162 miles, and the Thompson River has been shortened from 122 miles to 66 miles (Ryck, 1988). This loss in total length has also resulted in the almost total loss of extra channel areas, such as marshes, oxbows, and wetland lakes.

Four public lakes and several small private lakes provide the majority of impoundment fishing in the county. The public lakes are Che-Ru Lake (160 acres) at Fountain Grove Conservation Area; Indian Creek Community Lake (192 acres) (fig. 10); a 15-acre impoundment above Indian Creek Community Lake; and Pikes Lake (21 acres). These lakes are fished for largemouth bass, channel catfish, crappie, and bluegill. Approximately 2,000 private farm ponds and small lakes provide additional fishing opportunities (Noblitt, 1995).

The Food Security Act of 1985 has given landowners the opportunity to enhance wildlife habitat through various cost-share and incentive programs, such as the Conservation Reserve Program (CRP), the Agricultural Conservation Program (ACP), the Forestry Stewardship Incentive Program, and other programs funded by the State and by the soil and water conservation districts. Conservation tillage and other soil conservation measures that are encouraged through these programs can improve wildlife habitat.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In tables 12a and 12b, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. ***Not limited*** indicates that the soil has features that are very favorable for the

Figure 10.—Indian Creek Community Lake provides recreational opportunities and wildlife habitat in Livingston County.

specified use. Habitat is easily established, improved, or maintained. ***Slightly limited*** indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Habitat can be established, improved, or maintained. ***Moderately limited*** indicates that the soil has features that are moderately favorable for the specified use. Habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. ***Limited*** indicates that the soil has one or more features that are significant limitations for the specified use. Habitat is difficult to create, improve, or maintain in most places. Management is difficult and must be very intensive. ***Very limited*** indicates that the soil has one or more features that are unfavorable for the specified use. Habitat is usually impractical or impossible to create, improve, or maintain. Management would be very difficult, and unsatisfactory results can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity

of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation class for the component is based on the most severe limitation.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Selection should be made from a list of locally adapted species.

Domestic grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Selection should be made from a list of locally adapted species.

Upland wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Selection should be made from a list of locally adapted species.

Upland shrubs and vines are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs and vines are depth of the root zone, available water capacity, salinity, and soil moisture. Selection should be made from a list of locally adapted species.

Upland deciduous trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees are depth of the root zone, available water capacity, and wetness. Selection should be made from a list of locally adapted species.

Upland mixed deciduous-conifer trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, browse, seeds, and foliage. Soil properties and features that affect the growth of these trees are depth of the root zone, available water capacity, and wetness. Selection should be made from a list of locally adapted species.

Riparian herbaceous plants are annual and perennial native or naturally established grasses and forbs that grow on moist or wet sites. Soil properties and features affecting riparian herbaceous plants are surface texture, wetness, flooding, ponding, and surface stones. Selection should be made from a list of locally adapted species.

Riparian shrubs, vines, and trees are bushy woody plants and trees that grow on moist or wet sites. Soil properties and features affecting these plants are surface texture, wetness, flooding, ponding, and surface stones. Selection should be made from a list of locally adapted species.

Freshwater wetland plants are grasses, forbs, and shrubs that are adapted to wet soil conditions. The soils suitable for this habitat generally occur adjacent to springs, seeps, depressions, areas of bottom land, marshes, or backwater areas on flood plains. Most areas are ponded for some period of time during the year. Soil properties and features affecting these plants are surface texture, wetness, ponding, and soil reaction. Selection should be made from a list of locally adapted species.

Irrigated freshwater wetland plants are grasses, forbs, and shrubs that are adapted to wet soil conditions. The soils suitable for this habitat generally occur in areas of cropland, in previously cropped areas, and in marginal areas associated with cropland and wetlands. These areas may be ponded for some period of time during the year. They are generally suitable for restoring wetland features temporarily or permanently. Soil properties and features affecting these plants are surface texture, permeability, wetness, ponding, and soil reaction. Selection should be made from a list of locally adapted species.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, water management, and waste management. The ratings are based on observed performance of the soils and on the data in the tables described under the heading “Soil Properties.”

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and

construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; evaluate sites for agricultural waste management; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 13 shows the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. ***Not limited*** indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. ***Slightly limited*** indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. ***Moderately limited*** indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. ***Limited*** indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but overcoming them generally requires special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate or high maintenance can be expected. ***Very limited*** indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between

the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation rating for the component is based on the most severe limitation.

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, a water table, and ponding.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sanitary Facilities

The soils of the survey area are rated in table 14 according to limitations that affect their suitability for sanitary facilities. Soils are rated for septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect sanitary facilities. ***Not limited*** indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. ***Slightly limited*** indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. ***Moderately limited*** indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. ***Limited*** indicates that the soil has one or more features that are significant

limitations for the specified use. The limitations can be overcome, but overcoming them generally requires special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate or high maintenance can be expected. ***Very limited*** indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation rating for the component is based on the most severe limitation.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may be contaminated. Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, hillside seepage, and contamination of ground water, can affect public health.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A ***trench sanitary landfill*** is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the

proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an ***area sanitary landfill***, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Construction Materials and Excavating

The soils of the survey area are rated in table 15 as a source of roadfill, sand, gravel, or topsoil. Normal compaction, minor processing, and other standard construction practices are assumed. The soils are also rated according to limitations that affect their suitability for shallow excavations. The ratings in the table are both verbal and numerical.

For sand and gravel, the soils are rated as a ***probable, possible,*** or ***improbable*** source. A rating of ***probable*** indicates that the source material is likely to be in or below the soil. A rating of ***possible*** indicates that the source material may be in or below the soil and that further investigation is warranted. A rating of ***improbable*** indicates that the source material is unlikely to be in or below the soil. The numerical ratings in these columns indicate the degree of probability. A numerical rating of 1.00 indicates that the soil is an improbable source. A numerical rating of less than 1.00 indicates the degree to which the soil is a possible or probable source of sand or gravel.

Other rating class terms used in this table indicate the extent to which the soils are limited by soil features that affect their use as a source for roadfill or topsoil or their suitability for shallow excavations. ***Not limited*** indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. ***Slightly limited*** indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. ***Moderately limited*** indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. ***Limited*** indicates that

the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but overcoming them generally requires special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate or high maintenance can be expected. ***Very limited*** indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings for roadfill, topsoil, and shallow excavations indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation rating for the component is based on the most severe limitation.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Sand and ***gravel*** are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table, only the likelihood of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the lowest layer of the soil contains sand or gravel, the soil is rated as a probable source regardless of the thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Water Management

Table 16 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas, drainage, irrigation, terraces and diversions, and grassed waterways.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. ***Not limited*** indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. ***Slightly limited*** indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. ***Moderately limited*** indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. ***Limited*** indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but overcoming them generally requires special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate or high maintenance can be expected. ***Very limited*** indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation rating for the component is based on the most severe limitation.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Slope can affect the storage capacity of the reservoir area.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, permeability, depth to a water table, ponding, slope, and flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or a cemented pan, large stones, slope, and the likelihood that cutbanks will cave. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. The availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to a water table, ponding, flooding, available water capacity, intake rate, permeability, erodibility, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the depth of the root zone, reaction, and the amount of salts, sodium, sulfur, lime, or gypsum.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, a water table, ponding, large stones, and depth to bedrock affect the construction of terraces and diversions. A restricted rooting depth, erodibility, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, a water table, slope, and depth to bedrock affect the construction of grassed waterways. Erodibility, soil moisture regime, available water capacity, restricted rooting depth, restricted permeability, and toxic substances, such as salts and sodium, affect the growth and maintenance of the grass after construction.

Waste Management

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

Table 17 shows the degree and kind of soil limitations affecting the treatment of agricultural waste, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. In the context of this table, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 mg/l. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater generally ranges from 50 to 2,000 mg/l. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

The ratings in the table are for waste management systems that not only dispose of and treat organic waste or wastewater but also are beneficial to crops (application of manure and food-processing waste, application of sewage sludge, and disposal of wastewater through irrigation) and for waste management systems that are designed only for the purpose of wastewater disposal and treatment (slow rate treatment of wastewater and rapid infiltration of wastewater).

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. ***Not limited*** indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. ***Slightly limited*** indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. ***Moderately limited*** indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. ***Limited*** indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but overcoming them generally requires special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate or high maintenance can be expected. ***Very limited*** indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms and numerical ratings are shown for each limiting soil feature listed. As many as three soil features may be listed for each component. The overall limitation rating for the component is based on the most severe limitation.

Land application of manure and food-processing waste not only disposes of waste material but also improves crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are either solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye

used in food processing, are not considered in the ratings.

The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include permeability, a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste.

Land application of municipal sewage sludge not only disposes of waste material but also improves crop production by increasing the supply of nutrients in the soils where the material is applied. In the context of this table, sewage sludge is the residual product of the treatment of municipal sewage. The solid component consists mainly of cell mass, primarily bacteria cells that developed during secondary treatment and have incorporated soluble organics into their own bodies. The sludge has small amounts of sand, silt, and other solid debris. The content of nitrogen varies. Some sludge has constituents that are toxic to plants or hazardous to the food chain, such as heavy metals and exotic organic compounds, and should be analyzed chemically prior to use.

The content of water in the sludge ranges from about 98 percent to less than 40 percent. The sludge is considered liquid if it is more than about 90 percent water, slurry if it is about 50 to 90 percent water, and solid if it is less than about 50 percent water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the sludge is applied, and the method by which the sludge is applied. The properties that affect absorption, plant growth, and microbial activity include permeability, a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, available water capacity, reaction, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of sludge.

Disposal of wastewater by irrigation not only disposes of municipal wastewater and wastewater from food-processing plants, lagoons, and storage ponds but also improves crop production by increasing the amount of water available to crops. The ratings in the table are based on the soil properties that affect the design, construction, management, and performance of the irrigation system. The properties that affect design and management include the sodium adsorption ratio, a water table, ponding, available water capacity, permeability, slope, and flooding. The properties that affect construction include stones, cobbles, depth to bedrock or a cemented pan, a water table, and ponding. The properties that affect performance include depth to bedrock or a cemented pan, bulk density, the sodium adsorption ratio, salinity, reaction, and the cation-exchange capacity, which is used to estimate the capacity of a soil to adsorb heavy metals.

Treatment of wastewater by slow rate process is a process in which wastewater is applied to land at a rate normally between 0.5 inch and 4.0 inches per week. The application rate commonly exceeds the rate needed for irrigation of cropland. The applied wastewater is treated as it moves through the soil. Much of the treated water percolates to the ground water, and some enters the atmosphere through evapotranspiration. The applied water generally is not allowed to run off the surface. Waterlogging is prevented either through control of the application rate or through the use of tile drains, or both.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, and the application of waste. The properties that affect absorption include the sodium adsorption ratio, a water table, ponding, available water capacity, permeability, depth to bedrock or a cemented pan, reaction, the cation-exchange capacity, and slope. Reaction, the sodium adsorption ratio, salinity, and bulk density affect plant growth and microbial activity. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste.

Treatment of wastewater by rapid infiltration process is a process in which wastewater applied in a level basin at a rate of 4 to 120 inches per week percolates through the soil, eventually reaching the ground water. The application rate commonly exceeds the rate needed for irrigation of cropland. Vegetation is not a necessary part of the treatment; hence, the basins may or may not be vegetated. The thickness of the soil

material needed for proper treatment of the wastewater is more than 72 inches. As a result, geologic and hydrologic investigation is needed to ensure proper design and performance and to determine the risk of ground-water pollution.

The ratings in the table are based on the soil properties that affect the risk of pollution and the design, construction, and performance of the system. A water table, ponding, flooding, and depth to bedrock or a cemented pan affect the risk of pollution and the design and construction of the system. Slope, stones, and cobbles also affect design and construction. Permeability and reaction affect performance.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

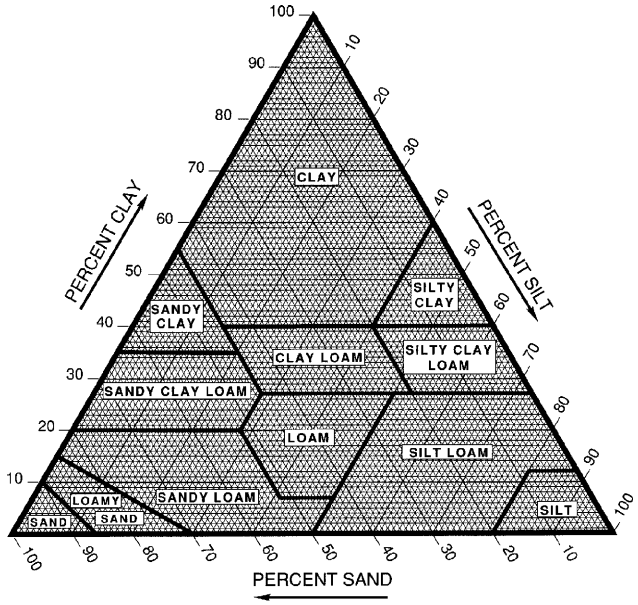

Figure 11.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

Engineering Index Properties

Table 18 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in abbreviations of the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 11). "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2001) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2000).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and ***plasticity index*** (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 19 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In the table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in micrometers per second (um/sec), when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The

capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable bases plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.

8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Water Features

Table 20 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in the table, the first letter is for drained areas and the second is for undrained areas.

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and ***frequency*** are estimated. Duration is expressed as ***extremely brief*** if 0.1 hour to 4 hours, ***very brief*** if 4 hours to 2 days, ***brief*** if 2 to 7 days, ***long*** if 7 to 30 days, and ***very long*** if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. ***None*** means that flooding is not probable; ***very rare*** that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); ***rare*** that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); ***occasional*** that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); ***frequent*** that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and ***very frequent*** that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year). Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in the table are depth to the seasonal high water table, the kind of water table, and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

An ***apparent*** water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A ***perched*** water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Soil Features

Table 21 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A ***restrictive layer*** is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. ***Depth to top*** is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as ***low, moderate,*** or ***high,*** is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as ***low, moderate,*** or ***high***. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1998 and 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 22 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in ***sol***. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (***Ud***, meaning humid, plus ***alf***, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (***Hapl***, meaning minimal horizonation, plus ***udalf***, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. An example is Mollic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, active, mesic Mollic Hapludalfs.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the “Soil Survey Manual” (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (Soil Survey Staff, 1999) and in “Keys to Soil Taxonomy” (Soil Survey Staff, 1998). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

Caleb Series

Depth class: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Permeability: Moderate
Landform: Till plains
Position on the landform: Toeslopes
Parent material: Alluvium

Slope class: Strongly sloping (9 to 14 percent)
Taxonomic classification: Fine-loamy, mixed, active, mesic Mollic Hapludalfs

Typical Pedon

Caleb silt loam, 9 to 14 percent slopes, eroded, 3,700 feet south and 600 feet west of the northeast corner of sec. 20, T. 57 N., R. 25 W.; USGS Utica West topographic quadrangle; UTM coordinates 4398105 meters N. and 437875 meters E.

Ap—0 to 3 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; friable; many very fine and fine roots; slightly acid; abrupt smooth boundary.
A—3 to 8 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; common very fine and fine roots; faint dark gray (10YR 4/1) silt coatings; moderately acid; clear smooth boundary.
Bt1—8 to 13 inches; brown (10YR 4/3) loam; moderate fine subangular blocky structure parting to weak fine granular; firm; common fine roots; distinct dark gray (10YR 4/1) silt coatings and many distinct clay films; moderately acid; clear smooth boundary.
Bt2—13 to 27 inches; yellowish brown (10YR 5/6) clay loam; common fine distinct brown (10YR 5/3) and few fine distinct pale brown (10YR 6/3) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; common fine roots; many distinct clay films; strongly acid; gradual smooth boundary.
Bt3—27 to 47 inches; dark yellowish brown (10YR 4/4) clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate fine prismatic; firm; few very fine and fine roots; few distinct clay films; strongly acid; gradual smooth boundary.
C—47 to 80 inches; dark yellowish brown (10YR 4/6) sandy loam; massive; friable; moderately acid.

Range in Characteristics

Thickness of the ochric epipedon: 8 inches
Depth to the argillic horizon: 8 inches
Depth to the C horizon: 47 to more than 80 inches

Ap and A horizons:
Hue—10YR
Value—3
Chroma—1 or 2
Texture of the fine-earth fraction—loam, silt loam, fine sandy loam, or clay loam
Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

E horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture of the fine-earth fraction—silt loam or loam
Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture of the fine-earth fraction—clay loam, loam, sandy clay loam, or sandy loam
Color of mottles—shades of brown or gray
Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Carlow Series

Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Permeability: Very slow
Landform: Flood plains in river valleys
Parent material: Alluvium
Slope class: Nearly level (0 to 3 percent)
Elevation: 672 feet
Taxonomic classification: Fine, smectitic, mesic Vertic Endoaquolls

Typical Pedon

Carlow silty clay, frequently flooded, 2,400 feet west and 2,600 feet north of the southeast corner of sec. 34, T. 57 N., R. 23 W.; USGS Avalon topographic quadrangle; UTM coordinates 4395510 meters N. and 459680 meters E.

Ap—0 to 4 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; weak fine granular structure; friable; few very fine and fine roots; moderately acid; abrupt smooth boundary.
A—4 to 11 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; weak fine subangular blocky structure; firm; few very fine roots; moderately acid; clear smooth boundary.
Bg1—11 to 17 inches; dark gray (10YR 4/1) and very dark gray (10YR 3/1) silty clay loam; few fine

distinct brown (10YR 4/3) mottles; weak fine subangular blocky structure; firm; few very fine roots; strongly acid; clear smooth boundary.
Bg2—17 to 27 inches; dark gray (5Y 4/1) silty clay; many fine prominent light olive brown (2.5Y 5/6) and many fine prominent yellowish brown (10YR 5/8) mottles; moderate fine subangular blocky structure; firm; few very fine roots; few black (N 2/0) manganese or iron-manganese stains; few black (N 2/0) iron-manganese concretions; strongly acid; clear smooth boundary.
Bg3—27 to 44 inches; dark gray (5Y 4/1) clay; common fine distinct olive (5Y 5/3) and common fine prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; firm; few very fine roots; many pressure faces and few black (N 2/0) manganese or iron-manganese stains; strongly acid; gradual smooth boundary.
Bg4—44 to 60 inches; gray (5Y 5/1) and dark gray (5Y 4/1) clay; common fine prominent dark yellowish brown (10YR 4/4 and 4/6) mottles; massive; firm; few very fine roots; few very dark gray (N 3/0) manganese or iron-manganese stains; few black (N 2/0) iron-manganese concretions; slightly acid; gradual smooth boundary.
Bg5—60 to 80 inches; gray (5Y 5/1) clay loam; common fine prominent yellowish brown (10YR 5/8) and few fine prominent dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to weak fine subangular blocky; firm; few black (N 2/0) iron-manganese concretions.

Range in Characteristics

Thickness of the mollic epipedon: 11 inches
Depth to the cambic horizon: 11 inches

Ap and A horizons:
Hue—10YR to 5Y
Value—2 or 3
Chroma—1 or 2
Texture of the fine-earth fraction—silty clay
Reaction—strongly acid to moderately acid (pH 5.1 to 6.0)

Bg horizon:
Hue—10YR to 5Y
Value—3 to 6
Chroma—1 or 2
Color of mottles—hue of 10YR to 5Y; value of 3 to 6; chroma of 3 to 8
Texture of the fine-earth fraction—silty clay, clay, or clay loam
Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Chillicothe Series

Depth class: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Permeability: Moderately slow
Landform: Till plains
Position on the landform: Summits
Parent material: Loess over residuum derived from limestone
Slope class: Moderately sloping (5 to 9 percent)
Elevation: 892 feet
Taxonomic classification: Fine, smectitic, mesic Oxyaquic Vertic Argiudolls

Typical Pedon

Chillicothe silty clay loam, 5 to 9 percent slopes, eroded, 1,725 feet east and 400 feet south of the northwest corner of sec. 8, T. 57 N., R. 25 W.; USGS Sample topographic quadrangle; UTM coordinates 4402390 meters N. and 437065 meters E.

Ap—0 to 3 inches; dark brown (10YR 3/3) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; many very fine roots; neutral; abrupt smooth boundary.
A—3 to 10 inches; dark brown (10YR 3/3) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; many very fine roots; slightly acid; clear smooth boundary.
Bt1—10 to 19 inches; dark yellowish brown (10YR 4/4) silty clay; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; common very fine roots; many distinct clay films on faces of peds and in pores; few masses of iron-manganese accumulation; slightly acid; clear smooth boundary.
Bt2—19 to 29 inches; brown (10YR 4/3) silty clay; few fine faint light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots; many distinct clay films on faces of peds and in pores; few masses of iron-manganese accumulation; strongly acid; clear smooth boundary.
Bt3—29 to 50 inches; brown (10YR 5/3) silty clay; common medium distinct dark yellowish brown (10YR 4/6) and common medium faint light gray (10YR 7/2) mottles; moderate medium prismatic

structure parting to moderate medium subangular blocky; firm; common very fine roots; common distinct clay films on faces of peds and in pores; moderately acid; clear smooth boundary.
2C—50 to 70 inches; reddish brown (5YR 4/4) silty clay; weak medium prismatic structure; firm; common distinct clay films in root channels and/or pores; slightly acid; abrupt wavy boundary.
2R—70 inches; limestone.

Range in Characteristics

Thickness of the mollic epipedon: 10 inches
Depth to the argillic horizon: 10 inches
Depth to the 2C horizon: 50 to more than 80 inches
Depth to lithic contact: 70 inches

Ap and A horizons:
Hue—10YR or 7.5YR
Value—2 or 3
Chroma—2 or 3
Texture of the fine-earth fraction—silty clay loam or silt loam
Reaction—moderately acid or slightly acid (pH 5.6 to 6.5)

Bt horizon:
Hue—10YR or 7.5YR
Value—3 to 5
Chroma—2 to 4
Texture of the fine-earth fraction—silty clay or silty clay loam
Reaction—strongly acid to slightly acid (pH 4.5 to 6.5)

2C horizon:
Hue—7.5YR or 5YR
Value—4 or 5
Chroma—4 to 8
Texture of the fine-earth fraction—silty clay or silty clay loam
Reaction—strongly acid to slightly acid (pH 4.5 to 6.5)

Colo Series

Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Permeability: Moderate
Landform: Flood plains in river valleys
Parent material: Alluvium
Slope class: Nearly level (0 to 3 percent)
Elevation: 718 feet
Taxonomic classification: Fine-silty, mixed, superactive, mesic Cumulic Endoaquolls

Typical Pedon

Colo silt loam, occasionally flooded, 3,200 feet west and 1,900 feet north of the southeast corner of sec. 19, T. 56 N., R. 25 W.; USGS Flat Creek topographic quadrangle; lat. 39 degrees 38 minutes 45 seconds N. and long. 93 degrees 45 minutes 3 seconds W.; UTM coordinates 4388498 meters N. and 435590 meters E.

Ap—0 to 4 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine granular structure; friable; few very fine roots; slightly acid; abrupt smooth boundary.
A1—4 to 12 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.
A2—12 to 22 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; friable; few very fine roots; moderately acid; gradual smooth boundary.
Bg1—22 to 28 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; few fine distinct dark yellowish brown (10YR 4/6) mottles; weak fine and medium subangular blocky structure; firm; few very fine roots; moderately acid; gradual smooth boundary.
Bg2—28 to 36 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; few fine distinct dark yellowish brown (10YR 4/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; very firm; few very fine roots; moderately acid; gradual smooth boundary.
Bg3—36 to 44 inches; very dark gray (10YR 3/1) and dark gray (10YR 4/1) silty clay loam, gray (10YR 5/1) and grayish brown (10YR 5/2) dry; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak fine prismatic structure parting to moderate fine angular blocky; very firm; few very fine roots; slightly acid; clear smooth boundary.
BCg—44 to 60 inches; gray (10YR 5/1) and dark gray (10YR 4/1) silty clay loam; weak medium prismatic structure parting to weak fine angular blocky; very firm; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 22 inches
Depth to the cambic horizon: 22 inches

Ap and A horizons:
Hue—10YR to 5Y
Value—2 or 3
Chroma—1 or 2
Texture of the fine-earth fraction—silty clay loam or silt loam

Reaction—moderately acid to neutral (pH 5.6 to 7.3)

Bg horizon:
Hue—10YR or 2.5Y
Value—2 to 4
Chroma—1
Texture of the fine-earth fraction—silty clay loam
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

BCg horizon:
Hue—10YR to 5Y or N
Value—3 to 6
Chroma—0 to 2
Texture of the fine-earth fraction—silty clay loam
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

Crestmeade Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Slow
Landform: Till plains
Position on the landform: Summits
Parent material: Loess
Slope class: Nearly level (0 to 3 percent)
Elevation: 699 feet
Taxonomic classification: Fine, smectitic, mesic Vertic Argialbolls

Typical Pedon

Crestmeade silt loam, 0 to 3 percent slopes, 375 feet south and 2,650 feet east of the northwest corner of sec. 17, T. 57 N., R. 23 W.; USGS Wheeling topographic quadrangle; lat. 39 degrees 45 minutes 40 seconds N. and long. 93 degrees 27 minutes 10 seconds W.

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; very friable; few very fine roots; neutral; abrupt smooth boundary.
A—4 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; few very fine roots; moderately acid; clear smooth boundary.
E—14 to 26 inches; grayish brown (10YR 5/2) silt loam; many fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium platy structure parting to moderate fine granular; very friable; few very fine roots; strongly acid; abrupt smooth boundary.
Btg—26 to 39 inches; dark grayish brown (10YR 4/2) silty clay; many medium prominent dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many faint continuous clay films on faces of peds; strongly acid; clear smooth boundary.
Bt—39 to 52 inches; brown (10YR 4/3) silty clay; few fine distinct dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common faint continuous clay films on faces of peds; strongly acid; clear smooth boundary.
BCg—52 to 70 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent yellowish red (5YR 5/8) mottles; weak medium prismatic structure; firm; few faint continuous clay films in root channels and/or pores; very strongly acid.

Range in Characteristics

Thickness of the mollic epipedon: 14 inches
Depth to the argillic horizon: 26 inches
Depth to the albic horizon: 14 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture of the fine-earth fraction—silty clay loam or silt loam
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

E horizon:
Hue—10YR or 2.5Y
Value—3 to 6
Chroma—1 or 2
Texture of the fine-earth fraction—silt loam or silty clay loam
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

Btg horizon:
Hue—10YR to 5Y
Value—4 to 6
Chroma—1 to 8
Texture of the fine-earth fraction—silty clay or silty clay loam
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

Bt horizon:
Hue—7.5YR to 5Y
Value—2 or 3
Chroma—1 or 2

Texture of the fine-earth fraction—silty clay or silty clay loam
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

BCg horizon:
Hue—10YR to 5Y
Value—4 to 6
Chroma—1 to 8
Texture of the fine-earth fraction—silty clay or silty clay loam
Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Dawn Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Moderately well drained
Permeability: Moderate
Landform: Hills on till plains
Position on the landform: Backslopes
Parent material: Residuum derived from sandstone-shale
Slope class: Moderately sloping (5 to 9 percent)
Elevation: 787 feet
Taxonomic classification: Coarse-loamy, mixed, superactive, mesic Oxyaquic Hapludolls

Typical Pedon

Dawn loam, 5 to 9 percent slopes, eroded, 1,000 feet east and 30 feet south of the northwest corner of sec. 31, T. 56 N., R. 24 W.; USGS Utica West topographic quadrangle; UTM coordinates 4386270 meters N. and 444839 meters E.

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; many very fine and fine roots; neutral; abrupt smooth boundary.
A—4 to 11 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; weak thin platy structure parting to moderate fine subangular blocky; friable; few very fine and fine roots; slightly alkaline; clear smooth boundary.
Bw1—11 to 16 inches; dark yellowish brown (10YR 4/6) loam; weak fine subangular blocky structure; friable; few very fine and fine roots; few distinct dark brown (10YR 3/3) clay films on faces of peds and in pores; slightly alkaline; clear smooth boundary.
Bw2—16 to 24 inches; dark yellowish brown (10YR 4/6) sandy loam; few fine prominent dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; friable; few very fine and fine roots; few distinct dark brown (10YR 3/3) clay films on faces of peds and in pores; sandstone fragments 20 to 75 millimeters in size; slightly alkaline; clear smooth boundary.
BC—24 to 37 inches; yellowish brown (10YR 5/6) very fine sandy loam; few fine prominent dark grayish brown (10YR 4/2) mottles; weak medium platy structure parting to moderate medium subangular blocky; friable; few fine roots; subangular sandstone fragments 20 to 75 millimeters in size; neutral; abrupt smooth boundary.
Cr—37 to 60 inches; weathered bedrock.

Range in Characteristics

Thickness of the mollic epipedon: 11 inches
Depth to paralithic contact: 37 inches
Depth to the cambic horizon: 11 inches
Depth to the Cr horizon: 37 to 40 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—2 or 3
Texture of the fine-earth fraction—loam or silt loam
Reaction—moderately acid to slightly alkaline (pH 5.6 to 7.8)

Bw horizon:
Hue—10YR to 5YR
Value—3 to 5
Chroma—3 to 8
Texture of the fine-earth fraction—loam, sandy loam, or very fine sandy loam
Reaction—moderately acid to slightly alkaline (pH 5.6 to 7.8)

BC horizon:
Hue—7.5YR to 2.5Y
Value—4 or 5
Chroma—4 to 6
Texture of the fine-earth fraction—loam, sandy loam, or very fine sandy loam
Reaction—moderately acid to slightly alkaline (pH 5.6 to 7.8)

Dockery Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Flood plains in river valleys
Parent material: Alluvium
Slope class: Nearly level (0 to 3 percent)

Elevation: 680 feet
Taxonomic classification: Fine-silty, mixed, superactive, nonacid, mesic Aquic Udifluvents

Typical Pedon

Dockery silt loam, frequently flooded, 900 feet east and 2,000 feet north of the southwest corner of sec. 36, T. 58 N., R. 23 W.; USGS Wheeling topographic quadrangle; UTM coordinates 4405245 meters N. and 462265 meters E.

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium granular structure; very friable; common fine roots; slightly acid; abrupt smooth boundary.
C—5 to 11 inches; very dark grayish brown (10YR 3/2), dark grayish brown (10YR 4/2), and grayish brown (10YR 5/2), stratified silt loam; massive; very friable; common fine roots; neutral; abrupt smooth boundary.
Cg1—11 to 28 inches; dark gray (10YR 4/1), gray (10YR 5/1), dark grayish brown (10YR 4/2), and grayish brown (10YR 5/2), stratified silt loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; massive; friable; few very fine and fine roots; neutral; clear smooth boundary.
Cg2—28 to 45 inches; dark grayish brown (10YR 4/2) and brown (10YR 4/3), stratified silt loam; common fine faint grayish brown (10YR 5/2) and common fine prominent dark yellowish brown (10YR 4/6) mottles; massive; friable; few very fine and fine roots; neutral; clear smooth boundary.
Cg3—45 to 60 inches; grayish brown (10YR 5/2), gray (10YR 5/1), and dark gray (10YR 4/1) silt loam; common fine prominent dark yellowish brown (10YR 4/6) mottles; massive; friable; few very fine and fine roots; slightly acid.

Range in Characteristics

Thickness of the ochric epipedon: 5 inches
Depth to the C horizon: 5 to more than 80 inches

Ap or A horizon:
Hue—10YR
Value—2 to 4
Chroma—2 or 3
Texture of the fine-earth fraction—silt loam or silty clay loam
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

C horizon:
Hue—10YR to 5Y
Value—3 to 6
Chroma—1 to 3
Color of mottles—hue of 2.5YR to 10YR; value of 4 to 6; chroma of 2 to 8
Texture of the fine-earth fraction—silt loam or silty clay loam
Reaction—moderately acid to moderately alkaline (pH 5.6 to 8.4)

Gosport Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Moderately well drained
Permeability: Very slow
Landform: Till plains
Position on the landform: Backslopes
Parent material: Residuum derived from shale
Slope class: Moderately steep (14 to 35 percent)
Elevation: 853 feet
Taxonomic classification: Fine, illitic, mesic Oxyaquic Dystrudepts

Typical Pedon

Gosport silt loam, 14 to 35 percent slopes, 300 feet east and 2,000 feet north of the southwest corner of sec. 28, T. 56 N., R. 24 W.; USGS Utica East topographic quadrangle; UTM coordinates 4367255 meters N. and 447810 meters E.

A1—0 to 3 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine granular structure; friable; common very fine and fine roots; neutral; abrupt wavy boundary.
A2—3 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common very fine and fine roots; neutral; abrupt wavy boundary.
E—6 to 9 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine subangular blocky structure; friable; common fine and medium roots; moderately acid; abrupt wavy boundary.
Bw1—9 to 13 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; common fine and medium roots and few coarse roots; few faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds and in pores; strongly acid; clear wavy boundary.
Bw2—13 to 18 inches; yellowish brown (10YR 5/4) silty clay; few fine distinct strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; very firm; common fine and medium roots and few coarse roots; very strongly acid; clear wavy boundary.
Bw3—18 to 33 inches; brown (7.5YR 5/4) silty clay;

few fine distinct grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; very firm; few fine and medium roots and few coarse roots; very strongly acid; clear wavy boundary.

C—33 to 39 inches; light yellowish brown (2.5Y 6/4) silt loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak medium platy structure parting to moderate fine angular blocky; very firm; few fine and medium roots; common oxide coatings; very strongly acid; clear wavy boundary.

Cr—39 to 60 inches; grayish brown (2.5Y 5/2), unweathered bedrock.

Range in Characteristics

Thickness of the ochric epipedon: 3 inches
Depth to the ochric horizon: 6 inches
Depth to the C horizon: 33 to 40 inches
Depth to the cambic horizon: 9 inches

A horizon:
Hue—10YR
Value—3 or 4
Chroma—1 or 2
Texture of the fine-earth fraction—silt loam or silty clay loam
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture of the fine-earth fraction—silt loam
Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Bw horizon:
Hue—10YR to 5Y
Value—5 or 6
Chroma—2 to 4
Color of mottles—hue of 10YR to 5Y; value of 5 or 6; chroma of 2 to 8
Texture of the fine-earth fraction—silty clay or clay
Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

C horizon:
Hue—10YR to 5Y
Value—4 to 6
Chroma—2 to 8
Color of mottles—hue of 10YR to 5Y or N; value of 4 to 6; chroma of 0 to 8
Texture of the fine-earth fraction—silty clay loam, silty clay, or clay
Reaction—very strongly acid to moderately acid (pH 4.5 to 5.6)

Greenton Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Slow
Landform: Till plains
Position on the landform: Shoulders or backslopes
Parent material: Loess over residuum derived from limestone-shale
Slope class: Moderately sloping and strongly sloping (5 to 14 percent)
Taxonomic classification: Fine, smectitic, mesic Aquertic Argiudolls

Typical Pedon

Greenton silty clay loam, 5 to 9 percent slopes, 2,200 feet east and 800 feet north of the southwest corner of sec. 29, T. 56 N., R. 24 W.; USGS Utica East topographic quadrangle; UTM coordinates 4386625 meters N. and 446790 meters E.

Ap—0 to 6 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; strong fine angular blocky structure; friable; common fine roots; slightly acid; clear smooth boundary.

A—6 to 13 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; strong medium angular blocky structure; friable; common fine roots; slightly acid; clear smooth boundary.

Btg1—13 to 17 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine distinct strong brown (7.5YR 4/6) mottles; strong medium and coarse angular blocky structure; firm; common fine roots; common distinct discontinuous brown (10YR 4/3) clay films on faces of peds and in pores; slightly acid; clear smooth boundary.

Btg2—17 to 21 inches; dark grayish brown (10YR 4/2) silty clay; few fine distinct strong brown (7.5YR 4/6) and few medium faint dark yellowish brown (10YR 4/6) mottles; moderate coarse angular blocky structure; very firm; common fine roots; common prominent continuous very dark grayish brown (10YR 3/2) clay films on faces of peds and in pores; neutral; clear smooth boundary.

Btg3—21 to 26 inches; dark grayish brown (2.5Y 4/2) silty clay; few fine distinct black (10YR 2/1) and common medium distinct light brownish gray (10YR 6/2) mottles; weak coarse angular blocky structure; very firm; common very fine roots; patchy clay films on faces of peds and in pores; neutral; abrupt smooth boundary.

2Cg1—26 to 41 inches; dark grayish brown (2.5Y 4/2) silty clay; massive; very firm; slightly effervescent;

10 percent limestone channers; slightly alkaline; clear smooth boundary.
2Cg2—41 to 60 inches; dark grayish brown (2.5Y 4/2) silty clay; massive; very firm; light gray (2.5Y 7/2) masses of carbonate; pale yellow (2.5Y 8/2) masses of carbonate and masses of iron-manganese accumulation; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 6 to 13 inches
Depth to the argillic horizon: 6 to 13 inches
Depth to the 2Cg horizon: 26 to more than 80 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture of the fine-earth fraction—silt loam or silty clay loam
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

Bt horizon:
Hue—7.5YR to 2.5Y
Value—3 to 6
Chroma—2 to 5
Texture of the fine-earth fraction—silty clay loam or silty clay
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

2C horizon:
Hue—7.5YR to 5Y
Value—2 to 5
Chroma—1 to 8
Texture of the fine-earth fraction—silty clay loam or silty clay
Reaction—neutral to moderately alkaline (pH 7.3 to 8.4)

Grundy Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Slow
Landform: Till plains
Position on the landform: Summits
Parent material: Loess
Slope class: Gently sloping (2 to 5 percent)
Taxonomic classification: Fine, smectitic, mesic Aquertic Argiudolls

Typical Pedon

Grundy silt loam, 2 to 5 percent slopes, 1,800 feet west and 2,800 feet north of the southeast corner of sec. 15, T. 56 N., R. 25 W.; USGS Utica West topographic quadrangle; UTM coordinates 4390529 meters N. and 439239 meters E.

Ap—0 to 6 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; common fine roots; slightly acid; abrupt smooth boundary.
A—6 to 13 inches; black (10YR 2/1) silt loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; common fine roots; moderately acid; clear smooth boundary.
Bt—13 to 18 inches; black (10YR 2/1) silty clay loam, gray (10YR 5/1) dry; moderate very fine subangular blocky structure; firm; common very fine and fine roots; few faint very dark gray (10YR 3/1) clay films on faces of peds and in pores; strongly acid; clear smooth boundary.
Btg1—18 to 27 inches; dark grayish brown (10YR 4/2) silty clay; common fine prominent strong brown (7.5YR 4/6) mottles; moderate very fine and fine subangular blocky structure; firm; few very fine and fine roots; many faint very dark gray (10YR 3/1) clay films on faces of peds and in pores; moderately acid; clear smooth boundary.
Btg2—27 to 36 inches; dark grayish brown (2.5Y 4/2) silty clay; few fine prominent dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to weak medium angular blocky; firm; few very fine and fine roots; common distinct very dark gray (10YR 3/1) clay films on faces of peds and in pores; few fine rounded iron-manganese concretions; slightly acid; clear smooth boundary.
Btg3—36 to 55 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent strong brown (7.5YR 4/6) and common medium prominent yellowish red (5YR 4/6) mottles; weak medium prismatic structure parting to weak medium angular blocky; firm; few very fine and fine roots; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds and in pores; neutral; clear smooth boundary.
Cg—55 to 70 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent strong brown (7.5YR 5/6) mottles; massive; firm; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 18 inches
Depth to the argillic horizon: 13 inches
Depth to the Cg horizon: 55 to more than 80 inches

Ap and A horizons:
Hue—10YR

Value—2 or 3
Chroma—1 or 2
Texture of the fine-earth fraction—silt loam or silty clay loam
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

Bt horizon:
Hue—10YR or 2.5Y
Value—3 or 4
Chroma—1 to 3
Texture of the fine-earth fraction—silty clay loam or silty clay
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

Btg horizon:
Hue—10YR or 2.5Y
Value—3 or 4
Chroma—1 or 2
Color of mottles—hue of 5YR to 10YR; value of 4 or 5; chroma of 2 to 6
Texture of the fine-earth fraction—silty clay
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

C horizon:
Hue—10YR to 5Y
Value—4 to 6
Chroma—1 or 2
Texture of the fine-earth fraction—silty clay loam
Reaction—slightly acid or neutral (pH 6.1 to 7.3)

Lagonda Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Slow
Landform: Till plains
Position on the landform: Backslopes or summits
Parent material: Loess over pedisediment
Slope class: Gently sloping and moderately sloping (2 to 9 percent)
Taxonomic classification: Fine, smectitic, mesic Aquertic Argiudolls

Typical Pedon

Lagonda silty clay loam, 2 to 5 percent slopes, eroded, 3,200 feet west and 1,200 feet south of the northeast corner of sec. 2, T. 56 N., R. 22 W.; USGS Fountain Grove topographic quadrangle; UTM coordinates 4389490 meters N. and 470750 meters E.

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; many fine roots; slightly alkaline; abrupt smooth boundary.

A—5 to 9 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; common fine roots; slightly alkaline; abrupt smooth boundary.

Btg1—9 to 17 inches; dark grayish brown (10YR 4/2) silty clay; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; few fine roots; few faint clay films on faces of peds and in pores; moderately acid; gradual smooth boundary.

Btg2—17 to 24 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds and in pores and few black stains; few black (N 2/0) concretions; slightly acid; gradual smooth boundary.

Btg3—24 to 35 inches; dark grayish brown (10YR 4/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds and in pores and few black stains; neutral; clear smooth boundary.

2Btg4—35 to 47 inches; grayish brown (10YR 5/2) and gray (10YR 6/1) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak fine angular blocky structure; firm; few fine roots; common distinct clay films on faces of peds and in pores and few black stains; neutral; clear smooth boundary.

3BCg—47 to 60 inches; grayish brown (10YR 5/2) clay loam; many coarse prominent yellowish brown (10YR 5/6) and common medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; few fine roots; common black stains; 3 percent mixed gravel; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 8 to 9 inches
Depth to the argillic horizon: 9 to 13 inches
Depth to the 2Btg horizon: 20 to more than 80 inches
Depth to the 3BCg horizon: 47 to more than 80 inches
Depth to the 3Cg horizon: 53 to more than 80 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture of the fine-earth fraction—silt loam or silty clay loam
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

Btg horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2
Texture of the fine-earth fraction—silty clay loam or silty clay
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

2Btg horizon:
Hue—10YR to 5Y
Value—4 to 6
Chroma—1 or 2
Texture of the fine-earth fraction—silty clay loam or silty clay
Reaction—neutral or slightly alkaline (pH 7.3 to 7.8)

3BCg horizon:
Hue—10YR to 5Y
Value—4 or 5
Chroma—1 or 2
Texture of the fine-earth fraction—clay loam or clay
Reaction—neutral to moderately alkaline (pH 7.3 to 8.4)

Lamoni Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Slow
Landform: Till plains
Position on the landform: Backslopes
Parent material: Loess over glacial till
Slope class: Strongly sloping (9 to 14 percent)
Elevation: 771 feet
Taxonomic classification: Fine, smectitic, mesic Aquertic Argiudolls

Typical Pedon

Lamoni loam, 9 to 14 percent slopes, eroded, 1,900 feet west and 2,200 feet north of the southeast corner of sec. 24, T. 59 N., R. 23 W.; USGS Chula topographic quadrangle; UTM coordinates 4418105 meters N. and 463000 meters E.

Ap—0 to 3 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A—3 to 7 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; many fine roots; moderately acid; clear smooth boundary.

2Btg1—7 to 17 inches; dark grayish brown (10YR 4/2) clay; many fine prominent yellowish brown (10YR 5/6) and many fine prominent red (2.5YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; many fine roots; many distinct clay films on faces of peds and in pores; 1 percent gravel; strongly acid; clear smooth boundary.

2Btg2—17 to 37 inches; yellowish brown (10YR 5/6) clay; many fine prominent light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; many distinct clay films on faces of peds and in pores; 1 percent gravel; strongly acid; gradual smooth boundary.

2Btg3—37 to 60 inches; yellowish brown (10YR 5/4) clay loam; many medium distinct gray (10YR 6/1) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; common distinct clay films on faces of peds and in pores; 2 percent gravel; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 7 inches
Depth to the argillic horizon: 7 inches
Depth to the 2Btg horizon: 7 to more than 80 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture of the fine-earth fraction—loam, silt loam, or silty clay loam
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

2Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Color of mottles—hue of 10YR to 5YR; value of 5 or 6; chroma of 1 to 6
Texture of the fine-earth fraction—clay or clay loam
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

Locksprings Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Moderately well drained
Permeability: Slow
Landform: Till plains
Position on the landform: Backslopes
Parent material: Residuum derived from limestone-shale

Slope class: Strongly sloping (9 to 30 percent)
Elevation: 853 feet
Taxonomic classification: Clayey-skeletal, mixed, superactive, mesic Oxyaquic Hapludalfs

Typical Pedon

Locksprings silty clay loam, 9 to 30 percent slopes, 2,550 feet west and 2,850 feet north of the southeast corner of sec. 10, T. 59 N., R. 25 W.; USGS Shearwood topographic quadrangle; UTM coordinates 4421025 meters N. and 440510 meters E.

A—0 to 7 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common very fine and fine roots; 10 percent limestone flagstones; neutral; abrupt irregular boundary.
Bt1—7 to 15 inches; dark yellowish brown (10YR 4/4) very bouldery clay; common fine faint yellowish brown (10YR 5/4) and few fine distinct dark gray (10YR 4/1) mottles; moderate fine subangular blocky structure; firm; common very fine and fine roots; common faint clay films on faces of peds and in pores and few organic coatings; few fine black (N 2/0) masses of iron-manganese accumulation; 50 percent limestone boulders; neutral; clear irregular boundary.
Bt2—15 to 28 inches; reddish brown (5YR 4/4) very bouldery clay; common fine prominent olive (5Y 4/4) and many medium prominent yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds and in pores and few organic coatings; few fine black (N 2/0) masses of iron-manganese accumulation; 50 percent limestone boulders; slightly acid; abrupt irregular boundary.
R—28 inches; unweathered bedrock.

Range in Characteristics

Thickness of the ochric epipedon: 7 inches
Depth to the argillic horizon: 7 inches
Depth to lithic contact: 28 inches

A horizon:
Hue—7.5YR or 10YR
Value—2 to 4
Chroma—1 to 3
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 10 percent
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

Bt horizon:
Hue—5YR to 10YR
Value—4 to 6
Chroma—4 to 8
Color of mottles—hue of 10YR to 5Y; value of 4 or 5; chroma of 1 to 6
Texture of the fine-earth fraction—clay
Content of rock fragments—40 to 55 percent
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

Putco Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Slow
Landform: Till plains
Position on the landform: Backslopes
Parent material: Mine spoil and earthfill
Slope class: Strongly sloping to steep (9 to 50 percent)
Elevation: 873 feet
Taxonomic classification: Fine, mixed, superactive, calcareous, mesic Typic Udorthents

Typical Pedon

Putco silty clay, in an area of Putco-Pits-Dumps complex, 9 to 50 percent slopes, 325 feet east and 525 feet north of the southwest corner of sec. 4, T. 59 N., R. 25 W.; USGS Shearwood topographic quadrangle; UTM coordinates 4421155 meters N. and 438310 meters E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) silty clay, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; common very fine and fine roots throughout; slightly alkaline; clear smooth boundary.
C—4 to 80 inches; olive brown (2.5Y 4/3), dark grayish brown (2.5Y 4/2), and light olive brown (2.5Y 5/4) channery silty clay; massive; firm; common very fine and fine roots throughout; slightly effervescent on faces of peds and in pores; 25 percent shale channers; moderately alkaline.

Range in Characteristics

Thickness of the ochric epipedon: 4 inches
Depth to the C horizon: 4 to more than 80 inches

A horizon:
Hue—10YR or 2.5Y
Value—2 to 5
Chroma—1 to 6
Texture of the fine-earth fraction—silty clay or silty clay loam

Reaction—neutral to moderately alkaline (pH 6.6 to 8.4)

C horizon:
Hue—10YR or 2.5Y
Value—3 to 6
Chroma—1 to 6
Texture of the fine-earth fraction—silty clay or clay
Reaction—slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Sampsel Series

Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Permeability: Slow
Landform: Till plains
Position on the landform: Backslopes
Parent material: Residuum derived from shale
Slope class: Gently sloping (1 to 5 percent)
Elevation: 807 feet
Taxonomic classification: Fine, smectitic, mesic Vertic Argiaquolls

Typical Pedon

Sampsel silty clay loam, 1 to 5 percent slopes, 1,400 feet south and 200 feet east of the northwest corner of sec. 9, T. 56 N., R. 25 W.; USGS Utica West topographic quadrangle; UTM coordinates 4392490 meters N. and 439420 meters E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine granular structure; friable; common very fine and fine roots; moderately acid; abrupt smooth boundary.

A—7 to 15 inches; black (10YR 2/1) and very dark grayish brown (10YR 3/2) silty clay loam, dark gray (10YR 4/1) and grayish brown (10YR 5/2) dry; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; common very fine and fine roots; slightly acid; clear smooth boundary.

Btg1—15 to 26 inches; dark grayish brown (2.5Y 4/2) silty clay; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to weak fine subangular blocky; firm; few very fine and fine roots; common distinct very dark gray (10YR 3/1) clay films on faces of peds and in pores and common faint very dark gray (N 3/0) organic coatings and few manganese or iron-manganese stains; neutral; clear smooth boundary.

Btg2—26 to 37 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to weak fine subangular blocky; firm; few very fine and fine roots; common distinct clay films on faces of peds and in pores; common fine iron-manganese concretions; neutral; clear smooth boundary.

Btg3—37 to 45 inches; gray (5Y 5/1) silty clay loam; common medium prominent strong brown (7.5YR 4/6) mottles; weak fine prismatic structure parting to weak fine subangular blocky; firm; few fine roots; few distinct clay films on faces of peds and in pores; few fine iron-manganese concretions; neutral; gradual smooth boundary.

Btg4—45 to 60 inches; gray (5Y 5/1) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; weak fine prismatic structure parting to weak fine subangular blocky; firm; few very fine roots; few prominent clay films on faces of peds and in pores; few fine iron-manganese concretions; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 15 inches
Depth to the argillic horizon: 15 inches

Ap and A horizons:
Hue—10YR or 2.5Y
Value—2 or 3
Chroma—1 or 2
Texture of the fine-earth fraction—silt loam or silty clay loam
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

Btg horizon:
Hue—10YR to 5Y
Value—3 to 6
Chroma—1 or 2
Color of mottles—hue of 7.5YR or 10YR; value of 4 or 5; chroma of 4 to 8
Texture of the fine-earth fraction—silty clay loam, silty clay, or clay
Reaction—moderately acid to slightly alkaline (pH 5.6 to 7.8)

Sandover Series

Depth class: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Permeability: Moderate
Landform: Flood plains in river valleys
Parent material: Sandy alluvium over loamy alluvium
Slope class: Nearly level (0 to 3 percent)
Taxonomic classification: Sandy over loamy, mixed, superactive, nonacid, mesic Aquic Udifluvents

Typical Pedon

Sandover loam, frequently flooded, 5,300 feet west and 500 feet north of the southeast corner of sec. 31, T. 58 N., R. 22 W.; USGS Wheeling topographic quadrangle; UTM coordinates 4404665 meters N. and 463845 meters E.

Ap—0 to 4 inches; brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; common very fine and fine roots; slightly acid; abrupt smooth boundary.

A—4 to 7 inches; brown (10YR 4/3) loam; weak fine granular structure; friable; common very fine and fine roots; slightly acid; abrupt smooth boundary.

C1—7 to 26 inches; dark grayish brown (10YR 4/2), light brownish gray (10YR 6/2), pale brown (10YR 6/3), yellowish brown (10YR 5/4), brown (10YR 5/3), gray (10YR 5/1), and light yellowish brown (10YR 6/4) loamy fine sand and sandy loam; massive; loose; few very fine and fine roots; moderately acid; abrupt smooth boundary.

2C2—26 to 46 inches; brown (10YR 5/3), gray (10YR 5/1), and light yellowish brown (10YR 6/4), stratified silt loam; massive; friable; few very fine roots; moderately acid; abrupt smooth boundary.

2Cg—46 to 60 inches; dark gray (10YR 4/1) silty clay loam; many medium prominent red (2.5YR 4/8) mottles; massive; firm; moderately acid.

Range in Characteristics

Thickness of the ochric epipedon: 7 inches
Depth to the C horizon: 7 to more than 80 inches
Depth to the 2C horizon: 26 to more than 80 inches

Ap and A horizons:
- Hue—10YR
- Value—3 or 4
- Chroma—2 to 4
- Texture of the fine-earth fraction—loam, loamy fine sand, fine sand, or sand
- Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

C horizon:
- Hue—10YR
- Value—3 to 6
- Chroma—2 to 4
- Texture of the fine-earth fraction—loamy fine sand, sandy loam, or sand
- Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

2C horizon:
- Hue—10YR
- Value—3 to 5
- Chroma—1 to 3
- Color of mottles—hue of 2.5YR to 10YR; value of 4 to 6; chroma of 4 to 8
- Texture of the fine-earth fraction—silt loam or silty clay loam
- Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

Sturges Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Slow
Landform: Till plains
Position on the landform: Summits
Parent material: Loess over pedisediment
Slope class: Nearly level (0 to 3 percent)
Elevation: 794 feet
Taxonomic classification: Fine, smectitic, mesic Vertic Argialbolls

Typical Pedon

Sturges silt loam, 0 to 3 percent slopes, 1,500 feet south and 350 feet west of the northeast corner of sec. 17, T. 58 N., R. 22 W.; USGS Wheeling topographic quadrangle; UTM coordinates 4410540 meters N. and 467145 meters E.

Ap—0 to 4 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; common very fine roots; slightly acid; abrupt smooth boundary.

A—4 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine prismatic structure; friable; common fine roots; neutral; clear smooth boundary.

E—9 to 12 inches; grayish brown (10YR 5/2) silt loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; common very fine roots; moderately acid; abrupt wavy boundary.

Bt1—12 to 15 inches; very dark grayish brown (10YR 3/2) silty clay, grayish brown (10YR 5/2) dry; common fine prominent yellowish red (5YR 5/8) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; firm; few very fine roots; many distinct clay films on faces of peds and in pores; very strongly acid; clear smooth boundary.

Bt2—15 to 20 inches; brown (10YR 4/3) and dark yellowish brown (10YR 4/6) clay; weak fine prismatic structure parting to moderate fine subangular blocky; firm; few very fine roots; many distinct clay films on faces of peds and in pores

and common distinct very dark gray (10YR 3/1) organic coatings; strongly acid; clear wavy boundary.
Btg1—20 to 30 inches; gray (10YR 5/1) silty clay; common medium prominent yellowish red (5YR 4/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; common faint clay films on faces of peds and in pores and few faint very dark gray (10YR 3/1) organic coatings; strongly acid; clear smooth boundary.
Btg2—30 to 42 inches; gray (2.5Y 6/1) silty clay loam; common fine prominent dark yellowish brown (10YR 4/6 and 3/6) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; firm; few fine roots; common faint clay films on faces of peds and in pores; moderately acid; clear smooth boundary.
Btg3—42 to 61 inches; gray (10YR 6/1) silty clay loam; many fine and medium prominent dark reddish brown (2.5YR 3/4) mottles; weak medium subangular blocky structure; firm; few faint clay films on faces of peds and in pores and common manganese or iron-manganese stains; common fine iron-manganese concretions; moderately acid; clear smooth boundary.
Cg—61 to 80 inches; light brownish gray (10YR 6/2) silty clay loam; few fine distinct yellowish brown (10YR 5/4) and few fine distinct dark yellowish brown (10YR 4/4) mottles; massive; firm.

Range in Characteristics

Thickness of the mollic epipedon: 12 inches
Depth to the argillic horizon: 12 inches
Depth to the Cg horizon: 61 to more than 80 inches
Depth to the albic horizon: 9 inches

Ap and A horizons:
Hue—10YR
Value—2 or 3
Chroma—1 to 3
Texture of the fine-earth fraction—silt loam
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

E horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—1 or 2
Color of mottles—hue of 10YR; value of 4 or 5; chroma of 4 to 6
Texture of the fine-earth fraction—silt loam
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

Bt horizon:
Hue—10YR or 2.5Y
Value—2 to 5
Chroma—2 to 6
Color of mottles—hue of 5YR to 10YR; value of 4 or 5; chroma of 4 to 8
Texture of the fine-earth fraction—silty clay or clay
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Color of mottles—hue of 2.5YR to 10YR; value of 3 to 5; chroma of 2 to 6
Texture of the fine-earth fraction—silty clay loam or silty clay
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

2Cg horizon:
Hue—10YR to 5Y
Value—4 to 6
Chroma—1 or 2
Color of mottles—hue of 5YR to 10YR; value of 4 or 5; chroma of 4 to 6
Texture of the fine-earth fraction—silty clay loam or silt loam
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

Tice Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Flood-plain steps in river valleys
Parent material: Silty alluvium
Slope class: Nearly level (0 to 3 percent)
Elevation: 663 feet
Taxonomic classification: Fine-silty, mixed, superactive, mesic Fluvaquentic Hapludolls

Typical Pedon

Tice silty clay, overwash, occasionally flooded, 3,750 feet east and 1,700 feet north of the southwest corner of sec. 11, T. 56 N., R. 22 W.; USGS Fountain Grove topographic quadrangle; UTM coordinates 4392125 meters N. and 471500 meters E.

Ap—0 to 4 inches; very dark gray (10YR 3/1) silty clay, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common fine roots; slightly acid; abrupt smooth boundary.
A1—4 to 12 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky and weak very fine subangular blocky structure; firm; few fine roots; moderately acid; abrupt smooth boundary.
A2—12 to 16 inches; very dark grayish brown (10YR

3/2) silt loam, grayish brown (10YR 5/2) dry; few fine faint dark gray (10YR 4/1) and few fine faint dark grayish brown (10YR 4/2) mottles; weak fine subangular blocky structure; firm; few fine roots; moderately acid; clear smooth boundary.

Bw1—16 to 30 inches; brown (10YR 5/3) silt loam; few fine faint dark grayish brown (10YR 4/2) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; moderately acid; clear smooth boundary.

Bw2—30 to 35 inches; brown (10YR 5/3) silt loam; few fine distinct gray (10YR 5/1) mottles; weak fine subangular blocky structure; few fine roots; strongly acid; abrupt smooth boundary.

Bw3—35 to 60 inches; brown (10YR 4/3) silt loam; common fine faint grayish brown (10YR 5/2) mottles; weak very fine subangular blocky structure; few fine roots; strongly acid.

Range in Characteristics

Thickness of the mollic epipedon: 16 to 17 inches
Depth to the Cg horizon: 54 to more than 80 inches
Depth to the cambic horizon: 16 to 22 inches

Ap and A horizons:
- Hue—10YR
- Value—2 or 3
- Chroma—1 or 2
- Texture of the fine-earth fraction—silt loam or silty clay
- Reaction—moderately acid to slightly alkaline (pH 5.6 to 7.8)

Bw horizon:
- Hue—10YR or 2.5Y
- Value—4 or 5
- Chroma—2 to 4
- Color of mottles—hue of 10YR to 5Y; value of 4 or 5; chroma of 1 or 2
- Texture of the fine-earth fraction—silty clay loam or silt loam
- Reaction—strongly acid to neutral (pH 5.1 to 7.3)

Triplett Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Slow
Landform: Stream terraces in river valleys
Parent material: Loess over alluvium
Slope class: Nearly level (1 to 3 percent)
Elevation: 689 feet
Taxonomic classification: Fine, smectitic, mesic Vertic Argialbolls

Typical Pedon

Triplett silt loam, 1 to 3 percent slopes, rarely flooded, 1,200 feet north and 4,200 feet east of the southwest corner of sec. 12, T. 57 N., R. 24 W.; USGS Chillicothe topographic quadrangle; UTM coordinates 4406045 meters N. and 447125 meters E.

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; very friable; common fine roots; slightly acid; abrupt smooth boundary.

A—4 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common fine roots; moderately acid; clear smooth boundary.

E—8 to 16 inches; grayish brown (10YR 5/2) silt loam; weak medium platy structure parting to moderate fine granular; very friable; common very fine and fine roots; strongly acid; abrupt smooth boundary.

Bt—16 to 29 inches; very dark grayish brown (10YR 3/2) silty clay, grayish brown (10YR 5/2) dry; common fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine and fine roots; many faint clay films on faces of peds and in pores; moderately acid; gradual smooth boundary.

Btg1—29 to 38 inches; dark grayish brown (10YR 4/2) silty clay; many fine distinct dark yellowish brown (10YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine and fine roots; common distinct clay films on faces of peds and in pores; strongly acid; gradual smooth boundary.

Btg2—38 to 45 inches; light brownish gray (10YR 6/2) silty clay; common fine faint dark grayish brown (10YR 4/2) and many medium prominent strong brown (7.5YR 5/8) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few very fine and fine roots; common distinct clay films on faces of peds and in pores; moderately acid; clear smooth boundary.

2BCg—45 to 70 inches; light gray (10YR 7/2) silty clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure; firm; few faint clay films in root channels and/or pores; moderately acid.

Range in Characteristics

Thickness of the mollic epipedon: 19 inches
Depth to the 2BCg horizon: 45 to more than 80 inches
Depth to the argillic horizon: 16 inches

Depth to the albic horizon: 8 inches

Ap and A horizons:
- Hue—10YR
- Value—2 or 3
- Chroma—1 or 2
- Texture of the fine-earth fraction—silt loam or silty clay loam
- Reaction—strongly acid to neutral (pH 5.1 to 7.3)

E horizon:
- Hue—10YR
- Value—4 to 6
- Chroma—1 or 2
- Texture of the fine-earth fraction—silt loam or silty clay loam
- Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Bt horizon:
- Hue—10YR or 2.5Y
- Value—2 or 3
- Chroma—1 or 2
- Color of mottles—hue of 10YR; value of 4 or 5; chroma of 4 to 6
- Texture of the fine-earth fraction—silty clay or clay
- Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

Btg horizon:
- Hue—10YR to 5Y
- Value—4 to 7
- Chroma—1 or 2
- Color of mottles—hue of 7.5YR to 2.5Y; value of 3 to 5; chroma of 4 to 8
- Texture of the fine-earth fraction—silty clay or silty clay loam
- Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

2Btg horizon:
- Hue—10YR or 2.5Y
- Value—4 to 7
- Chroma—1 or 2
- Color of mottles—hue of 7.5YR to 2.5Y; value of 3 to 5; chroma of 4 to 8
- Texture of the fine-earth fraction—silty clay loam or silt loam
- Reaction—strongly acid to slightly acid (pH 5.1 to 6.5)

Vesser Series

Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Permeability: Moderate
Landform: Flood-plain steps in river valleys
Parent material: Alluvium
Slope class: Nearly level (0 to 3 percent)
Elevation: 669 feet
Taxonomic classification: Fine-silty, mixed, superactive, mesic Argiaquic Argialbolls

Typical Pedon

Vesser silt loam, occasionally flooded, 1,800 feet east and 100 feet south of the northwest corner of sec. 21, T. 57 N., R. 22 W.; USGS Avalon topographic quadrangle; UTM coordinates 4406045 meters N. and 447125 meters E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; many fine roots; moderately acid; abrupt smooth boundary.

A—6 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium platy structure parting to moderate fine subangular blocky; friable; common fine roots; moderately acid; clear smooth boundary.

E1—14 to 26 inches; grayish brown (10YR 5/2) silt loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; friable; common fine roots; strongly acid; clear smooth boundary.

E2—26 to 33 inches; grayish brown (10YR 5/2) silt loam; weak fine subangular blocky structure; friable; common fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings; few medium black (N 2/0) iron-manganese concretions; strongly acid; clear smooth boundary.

Btg1—33 to 50 inches; dark gray (10YR 4/1) silty clay loam; common medium faint grayish brown (10YR 5/2) and few fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; common fine roots; strongly acid; gradual smooth boundary.

Btg2—50 to 60 inches; dark grayish brown (10YR 4/2) and gray (10YR 5/1) silty clay loam; weak fine angular blocky structure; firm; few fine roots; common distinct black (N 2/0) iron stains; moderately acid.

Range in Characteristics

Thickness of the mollic epipedon: 14 inches
Depth to the argillic horizon: 33 inches
Depth to the albic horizon: 14 inches

Ap and A horizons:
- Hue—10YR
- Value—2 or 3
- Chroma—1 or 2

Texture of the fine-earth fraction—silt loam
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

E horizon:
Hue—10YR
Value—3 to 5
Chroma—1 or 2
Color of mottles—hue of 7.5YR or 10YR; value of 4 or 5; chroma of 3 to 6
Texture of the fine-earth fraction—silt loam
Reaction—strongly acid or moderately acid (pH 5.1 to 6.0)

Btg horizon:
Hue—10YR or 2.5Y
Value—3 to 5
Chroma—1 or 2
Color of mottles—hue of 7.5YR or 10YR; value of 3 to 5; chroma of 2 to 6
Texture of the fine-earth fraction—silty clay loam or silty clay
Reaction—strongly acid or moderately acid (pH 5.1 to 6.0)

Wabash Series

Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Permeability: Very slow
Landform: Flood plains in river valleys
Parent material: Alluvium
Slope class: Nearly level (0 to 2 percent)
Elevation: 699 feet
Taxonomic classification: Fine, smectitic, mesic Cumulic Vertic Endoaquolls

Typical Pedon

Wabash silty clay, frequently flooded, 1,350 feet east and 4,300 feet north of the southwest corner of sec. 13, T. 56 N., R. 25 W.; USGS Utica West topographic quadrangle; UTM coordinates 4390800 meters N. and 443330 meters E.

Ap—0 to 4 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; firm; common fine roots; slightly acid; abrupt smooth boundary.
A1—4 to 16 inches; black (N 2/0) silty clay, dark gray (10YR 4/1) dry; few fine prominent very dark gray (10YR 3/1) mottles; moderate medium subangular blocky structure parting to weak fine subangular blocky; firm; common very fine and fine roots; few fine dark concretions; strongly acid; clear smooth boundary.
A2—16 to 26 inches; very dark gray (N 3/0) silty clay, dark gray (10YR 4/1) dry; few fine prominent dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure parting to weak fine subangular blocky; firm; few very fine and fine roots; few fine dark concretions; strongly acid; clear smooth boundary.
Bg1—26 to 40 inches; very dark gray (N 3/0) silty clay, dark gray (10YR 4/1) dry; weak medium prismatic structure parting to moderate fine subangular blocky; firm; few very fine roots; few pressure faces; strongly acid; clear smooth boundary.
Bg2—40 to 70 inches; dark gray (N 4/0) silty clay; few fine prominent brown (10YR 4/3) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; firm; common pressure faces; moderately acid; clear smooth boundary.
Bg3—70 to 80 inches; dark gray (N 4/0) silty clay; few fine prominent dark brown (10YR 3/3) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm.

Range in Characteristics

Thickness of the mollic epipedon: 40 inches

Ap and A horizons:
Hue—10YR to 5Y or N
Value—2 or 3
Chroma—0 to 2
Color of mottles—hue of 10YR; value of 4 or 5; chroma of 4 to 6
Texture of the fine-earth fraction—silty clay or clay
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

Bg horizon:
Hue—10YR to 5Y or N
Value—2 to 5
Chroma—0 to 2
Color of mottles—hue of 10YR; value of 3 to 5; chroma of 1 to 6
Texture of the fine-earth fraction—silty clay or clay
Reaction—strongly acid to slightly alkaline (pH 5.1 to 7.8)

Weller Series

Depth class: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Permeability: Slow
Landform: Till plains
Position on the landform: Summits or footslopes
Parent material: Loess
Slope class: Gently sloping and moderately sloping (3 to 9 percent)

Elevation: 892 feet
Taxonomic classification: Fine, smectitic, mesic Aquertic Chromic Hapludalfs

Typical Pedon

Weller silt loam, 3 to 9 percent slopes, 1,175 feet east and 1,800 feet south of the northwest corner of sec. 3, T. 59 N., R. 25 W.; USGS Shearwood topographic quadrangle; UTM coordinates 4422865 meters N. and 440000 meters E.

Ap1—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; common very fine and fine roots; slightly acid; abrupt smooth boundary.
Ap2—3 to 5 inches; dark grayish brown (10YR 4/2) silt loam; weak fine subangular blocky structure parting to moderate fine granular; friable; common very fine and fine roots; slightly acid; abrupt smooth boundary.
E—5 to 10 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; common very fine and fine roots; moderately acid; clear smooth boundary.
Bt1—10 to 14 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; few very fine and fine roots; few silt coatings and few faint clay films on faces of peds and in pores; strongly acid; clear smooth boundary.
Bt2—14 to 23 inches; yellowish brown (10YR 5/4) silty clay; common fine distinct grayish brown (10YR 5/2) mottles; moderate fine prismatic structure parting to weak medium subangular blocky; firm; few very fine and fine roots; common distinct clay films on faces of peds and in pores; very strongly acid; clear smooth boundary.
Bt3—23 to 35 inches; dark yellowish brown (10YR 4/4) silty clay; common fine distinct yellowish brown (10YR 5/8) and common fine distinct light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine and fine roots; common distinct clay films on faces of peds and in pores; very strongly acid; clear smooth boundary.
Btg—35 to 60 inches; light gray (10YR 7/1) and yellowish brown (10YR 5/4) silty clay loam; many coarse distinct light brownish gray (10YR 6/2) mottles; weak medium prismatic structure; firm; common faint clay films on faces of peds and in pores; moderately acid.

Range in Characteristics

Thickness of the ochric epipedon: 10 to 11 inches
Depth to the argillic horizon: 10 to 11 inches

Ap or A horizon:
Hue—10YR
Value—3 to 5
Chroma—1 to 3
Texture of the fine-earth fraction—silt loam or silty clay loam
Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture of the fine-earth fraction—silt loam or silty clay loam
Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Bt horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Color of mottles—hue of 7.5YR to 2.5Y; value of 4 or 5; chroma of 2 to 6
Texture of the fine-earth fraction—silty clay or silty clay loam
Reaction—very strongly acid to moderately acid (pH 4.5 to 6.0)

2Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 7
Chroma—2 to 6
Color of mottles—hue of 7.5YR or 10YR; value of 4 or 5; chroma of 2 to 6
Texture of the fine-earth fraction—silty clay or silty clay loam
Reaction—strongly acid or moderately acid (pH 5.1 to 6.0)

Zook Series

Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Permeability: Slow
Landform: Flood plains in river valleys
Parent material: Alluvium
Slope class: Nearly level (0 to 3 percent)
Elevation: 659 feet

Taxonomic classification: Fine, smectitic, mesic Cumulic Vertic Endoaquolls

Typical Pedon

Zook silty clay loam, overwash, frequently flooded, 4,325 feet east and 4,400 feet north of the southwest corner of sec. 11, T. 56 N., R. 22 W.; USGS Fountain Grove topographic quadrangle; UTM coordinates 4392830 meters N. and 471710 meters E.

A1—0 to 4 inches; very dark brown (10YR 2/2) silty clay loam, gray (10YR 5/1) dry; moderate thin platy structure; friable; common fine roots; neutral; abrupt smooth boundary.

A2—4 to 13 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; weak fine angular blocky structure; firm; few very fine roots; slightly acid; clear smooth boundary.

A3—13 to 36 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; moderate fine angular blocky structure; firm; few fine roots; moderately acid; gradual smooth boundary.

A4—36 to 46 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; few fine prominent dark yellowish brown (10YR 4/6) mottles; moderate fine angular blocky structure; firm; moderately acid; clear smooth boundary.

Bg—46 to 60 inches; dark gray (10YR 4/1) silty clay loam; few fine prominent dark yellowish brown (10YR 4/6) mottles; weak fine subangular blocky structure; firm; strongly acid.

Range in Characteristics

Thickness of the mollic epipedon: 46 inches

Ap or A horizon:

Hue—10YR or N
Value—2 or 3
Chroma—0 to 2
Texture of the fine-earth fraction—silty clay or silty clay loam
Reaction—moderately acid to neutral (pH 5.6 to 7.3)

Bg horizon:

Hue—10YR to 5Y
Value—2 to 5
Chroma—1
Color of mottles—hue of 10YR; value of 4 or 5; chroma of 4 to 6
Texture of the fine-earth fraction—silty clay or silty clay loam
Reaction—moderately acid to slightly alkaline (pH 5.6 to 7.8)

Formation of the Soils

Soil is the product of soil-forming processes acting on accumulated or deposited geologic material. The characteristics of the soil are determined by the type of parent material; the plant and animal life on and in the soil; the climate under which the soil-forming factors were active; topography, or lay of the land; and the length of time these forces have been active.

Parent material affects the kind of soil profile that forms and in extreme cases determines it almost entirely. Plant and animal life are the active factors of soil formation. The climate determines the amount of water available for leaching and the amount of heat for physical and chemical changes. Together, climate and plant and animal life act on the parent material and slowly change it to a natural body that has genetically related horizons. Topography modifies the effects of these other factors of soil formation. Finally, time is required for changes in the parent material to result in the formation of a soil. Generally, a long time is required for the development of distinct soil horizons.

These factors of soil formation are all so closely interrelated in their effects on the soil that few generalizations can be made about the effect of any one factor unless conditions are specified for the other four. Soil formation is complex, and many processes of soil development are still unknown.

Parent Material

Parent material is the unconsolidated mass from which a soil is formed. The formation or the deposition of this material is the first step in the development of a soil profile. The characteristics of the material determine the chemical and mineralogical composition of the soil. In Livingston County, four kinds of parent material, alone or in combinations of two or more, have contributed to the formation of the soils. These four kinds of parent material are residuum, or material weathered from bedrock; glacial material; loess, or wind-deposited material; and alluvium, or water-deposited material.

Greenton, Chillicothe, and Locksprings soils formed in residuum derived from shale with thin layers of interbedded limestone.

Glacial parent material, composed of clay, silt, sand, gravel, and a few boulders, was transported by glaciation. Much of the glacial material was moved long distances, but some is of local origin. Lamoni and Caleb soils formed in glacial till. In addition, Lagonda soils formed in glacial material with a thin loess cap.

Loess, a silty material transported by wind, is an extensive parent material of the soils in Livingston County. The principal source of the loess is believed to have been the flood plains along the Missouri, Grand, and Thompson Rivers after the retreat of the last glacier. The thickest deposits of loess are on the hills bordering the flood plains. In these areas, loess is the parent material for Grundy soils.

Alluvium is material that was transported by water and deposited on nearly level flood plains. Reflecting the diverse origins and varying speeds of flowing water, this material varies greatly in texture and mineralogical composition. Flood plains of small tributary streams are limited to local uplands as a source of parent material. The coarser textured Dockery and Sandover soils were deposited near the stream channel, where the current is strongest. The finer textured Carlow and Zook soils formed away from the stream channels, where the finer clay particles settled from the backwaters. The vast drainage area of the Grand River provides parent material for the soils on its flood plain. The size of this area accounts for the wider range in textures of the soils on the flood plain along the Grand River. These soils reflect the varying speeds of the flowing water. The parent material for the coarser Sandover soils was deposited while the water had sufficient flow and velocity to carry sand-sized particles. The parent material for the finer textured Carlow, Zook, and Wabash soils was deposited in slackwater areas.

Living Organisms

Plants and animals living on or in the soil are active in the soil-forming process. Plants furnish organic material to the soil and bring up plant nutrients from the underlying layers to the surface layer. As plants die and decay, they contribute organic material to the soil. Bacteria and fungi decompose the plant remains and help to incorporate the organic material into the soil.

The kind of native vegetation (for example, prairie grasses or forest) has greatly influenced soil formation. The organic material added to soils that formed under prairie grasses is largely a result of the yearly decomposition of plant materials. Plant tops decompose at the surface, but a large quantity of organic material is provided by the plant roots, which decompose at various depths in the soil. As a result, soils that formed under prairie grasses have a thick, dark surface layer. Grundy and Lagonda soils are examples of soils that formed under this type of vegetation.

The organic material added to soils that formed under forest vegetation is mostly the result of leaves and twigs, which decompose on the surface. These soils have a thin, dark surface layer. Locksprings soils are examples.

Insects, worms, animals, and human activities affect the formation of soils. Bacteria and fungi have a more significant effect than animals on soil formation. They promote the decomposition of organic materials, fix nitrogen, and improve tilth. Burrowing animals and insects loosen and mix various soil horizons. In a relatively short time, human activities have greatly affected the soil-formation process. The major alteration has resulted from changes in vegetation, drainage, and accelerated erosion. Row crops have replaced native grasses and trees. Nearly all of the areas on flood plains and many upland areas are now farmed. These changes have increased food production. In terms of sustained productivity, however, human activities have had an adverse effect. Accelerated erosion continues to reduce the potential of many upland soils, and the loss of cropland to urban development is virtually irreversible.

Climate

Climate has been and still is an important factor in soil formation. Geologic erosion, plant and animal life, and, more recently, accelerated erosion have all varied with the climate. Present climatic conditions tend to favor forested conditions rather than prairie grasses. The prairie areas that once existed in the survey area resulted from a more arid climatic cycle.

The glacial periods, which have greatly affected the soil-forming processes, were a result of climatic changes. Thousands of years of cold temperatures resulted in glaciers that moved into the area. Warmer weather and high winds resulted in severe geologic erosion, and much of the area was covered by loess.

High temperatures and adequate rainfall encourage rapid chemical and physical changes. This type of climate is conducive to the breakdown of minerals and the relocation of clay within the soil. When the clay is moved downward into the soil profile, a subsoil forms. Nearly all of the upland soils in the county show evidence of this process.

Topography

Topography, or the lay of the land, affects soil formation through its influence on drainage, runoff, infiltration, and accelerated erosion. Topography is characterized by length, shape, aspect, and degree of slope. It is important in determining the pattern and distribution of soils.

The amount of water entering the soil depends on the slope, the permeability of the soil, and the intensity of rainfall. Because runoff is rapid in steep areas, very little water passes through the soil and soil formation is slow. Geologic erosion almost keeps pace with the soil-forming processes. In gently sloping areas, runoff is slow, erosion is minimal, and most of the water passes through the soil. Leaching, the translocation of clay, and other soil-forming processes are intensified in these areas. Soils in these areas generally exhibit maximum profile development.

Soils on steep, south-facing slopes receive more direct sunlight and are drier than similar types of soils on north-facing slopes. The drier conditions influence soil formation by affecting the kind of vegetation, the susceptibility to erosion, and the cycles of freezing and thawing.

Time

The degree of profile development is dependent on the length of time that the parent material has been in place and subject to the soil-forming processes. Older soils, such as Grundy, Crestmeade, and Lamoni soils, show the effects of leaching and clay movement and have distinct horizons. Younger soils, which generally are alluvial soils, show little profile development. Dockery soils are examples.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope. A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Board foot. A unit of measure of the wood in lumber, logs, or trees. The amount of wood in a board 1 foot wide, 1 foot long, and 1 inch thick before finishing.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Cement rock. Shaly limestone used in the manufacture of cement.

Channeled. Refers to a drainage area in which natural meandering or repeated branching and convergence of a streambed have created deeply incised cuts, either active or abandoned, in alluvial material.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clayey soil. Silty clay, sandy clay, or clay.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Clearcut. A method of forest harvesting that removes the entire stand of trees in one cutting. Reproduction is achieved artificially or by natural seeding from the adjacent stands.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Codominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above but comparatively little from the sides.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Dominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above and from the sides.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a

consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—***excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,*** and ***very poorly drained***. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. An area of ground at a lower elevation than the surrounding ground and in which water collects and is drained to a closed depression or lake or to a drainageway at a lower elevation. A drainageway may or may not have distinctly incised channels at its upper reaches or throughout its course.

Droughty (in tables). The soil holds an insufficient amount of water for plants during dry periods.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Even aged. Refers to a stand of trees in which only small differences in age occur between individual trees. A range of 20 years is allowed.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called ***normal field capacity, normal moisture capacity,*** or ***capillary capacity***.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope

sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciated uplands. Land areas that were previously covered by continental or alpine glaciers and that are at a higher elevation than the flood plain.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

Highly erodible (in tables). The soil has a wind erodibility index greater than 8 and is very susceptible to erosion by water.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the

main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-

growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

K_{sat}. Saturated hydraulic conductivity. (See Permeability.)

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy soil. Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, or silty clay loam.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mean annual increment (MAI). The average annual increase in volume of a tree during the entire life of the tree.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Merchantable trees. Trees that are of sufficient size to be economically processed into wood products.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—***few, common,*** and ***many;*** size—***fine, medium,*** and ***coarse;*** and contrast—***faint, distinct,*** and ***prominent***. The size measurements are of the diameter along the greatest dimension. ***Fine*** indicates less than 5

millimeters (about 0.2 inch); ***medium,*** from 5 to 15 millimeters (about 0.2 to 0.6 inch); and ***coarse,*** more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Overstory. The trees in a forest that form the upper crown cover.

Oxbow. The horseshoe-shaped channel of a former meander, remaining after the stream formed a cutoff across a narrow meander neck.

Paleoterrace. An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, ***hardpan, fragipan, claypan, plowpan,*** and ***traffic pan***.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Impermeable	less than 0.0015 inch
Very slow	0.0015 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical

means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy soil. Sand or loamy sand.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Sawlogs. Logs of suitable size and quality for the production of lumber.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site class. A grouping of site indexes into five to seven production capability levels. Each level can be represented by a site curve.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 100 years old or are 100 years old at breast height.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees

in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Skid trails. Pathways along which logs are dragged to a common site for loading onto a logging truck.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of rock fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Strath terrace. A surface cut formed by the erosion of hard or semiconsolidated bedrock and thinly mantled with stream deposits.

Stream channel. The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected remnants of an abandoned flood plain, streambed, or valley floor produced during a former stage of erosion or deposition.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—***platy*** (laminated), ***prismatic*** (vertical axis of aggregates longer than horizontal), ***columnar*** (prisms with rounded tops), ***blocky*** (angular or subangular), and ***granular***. ***Structureless*** soils are either ***single grain*** (each grain by itself, as in dune sand) or ***massive*** (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. The topographically highest position of a

hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are ***sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,*** and ***clay***. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine." The abbreviations (see table 18) are ***C—clay, CL—clay loam, COS—coarse sand, COSL—coarse sandy loam, FS—fine sand, FSL—fine sandy loam, L—loam, LCOS—loamy coarse sand, LFS—loamy fine sand, LS—loamy sand, LVFS—loamy very fine sand, S—sand, SC—sandy clay, SCL—sandy clay loam, SI—silt, SIC—silty clay, SICL—silty clay loam, SIL—silt loam, SL—sandy loam, VFS—very fine sand,*** and ***VFSL—very fine sandy loam.*** Terms used in lieu of texture descriptions are ***WB—weathered bedrock*** and ***UWB—unweathered bedrock.*** The texture modifiers that may apply to textural classes are ***BY—bouldery, BYV—very bouldery, BYX—extremely bouldery, CB—cobbly, CBV—very cobbly, CBX—extremely cobbly, CN—channery, CNV—very channery, CNX—extremely channery, FL—flaggy, FLV—very flaggy, FLX—extremely flaggy, GR—gravelly, GRV—very gravelly, GRX—extremely gravelly,*** ***SR—stratified, ST—stony, STV—very stony,*** and ***STX—extremely stony.***

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Trafficability. The degree to which a soil is capable of supporting vehicular traffic across a wide range in soil moisture conditions.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley. An elongated depressional area primarily developed by stream action.

Water-spreading. Diverting runoff from natural channels by means of a system of dams, dikes, or ditches and spreading it over relatively flat surfaces.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1961-90 at Chillicothe, Missouri)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	38.2	17.3	27.7	66	-11	1	1.32	0.33	2.20	2	5.5
February---	40.7	19.6	30.1	71	-14	3	1.04	.37	1.59	3	4.3
March------	53.8	31.5	42.6	82	13	46	2.56	1.24	3.71	5	1.5
April------	65.6	41.1	53.4	89	23	181	3.37	1.76	4.79	6	.0
May--------	74.1	51.6	62.9	90	34	403	4.35	2.82	5.74	7	.0
June-------	83.7	61.2	72.5	98	45	666	4.05	2.39	5.53	6	.0
July-------	88.3	66.4	77.3	99	54	844	3.86	1.47	5.86	5	.0
August-----	85.9	63.1	74.5	103	47	759	3.81	1.31	5.87	6	.0
September--	78.7	54.8	66.8	96	32	497	4.96	2.25	7.29	6	.0
October----	66.1	41.9	54.0	87	24	174	3.26	1.43	4.83	5	.0
November---	52.9	31.5	42.2	78	10	37	2.26	.73	3.52	4	.7
December---	37.7	19.1	28.4	67	-15	3	1.66	.65	2.50	3	4.3
Yearly:											
Average---	63.8	41.6	52.7	---	---	---	---	---	---	---	---
Extreme---	109	-26	---	104	-19	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,613	36.51	28.23	42.03	58	16.4

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at Chillicothe, Missouri)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 12	Apr. 22	Apr. 30
2 years in 10 later than--	Apr. 6	Apr. 17	Apr. 26
5 years in 10 later than--	Mar. 26	Apr. 8	Apr. 18
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 29	Oct. 14	Sept. 24
2 years in 10 earlier than--	Nov. 3	Oct. 18	Sept. 28
5 years in 10 earlier than--	Nov. 13	Oct. 26	Oct. 4

Table 3.--Growing Season

(Recorded in the period 1961-90 at Chillicothe, Missouri)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	212	186	158
8 years in 10	218	191	163
5 years in 10	231	200	171
2 years in 10	244	209	179
1 year in 10	251	214	183

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
10A	Sturges silt loam, 0 to 3 percent slopes	4,277	1.2
12A	Crestmeade silt loam, 0 to 3 percent slopes	3,603	1.0
14B	Grundy silt loam, 2 to 5 percent slopes	13,022	3.8
20F	Locksprings silty clay loam, 9 to 30 percent slopes	16,719	4.8
21B	Weller silt loam, bench, 2 to 7 percent slopes	1,170	0.3
22C	Weller silt loam, 3 to 9 percent slopes	2,795	0.8
26C2	Chillicothe silty clay loam, 5 to 9 percent slopes, eroded	2,839	0.8
28C	Greenton silty clay loam, 5 to 9 percent slopes	32,017	9.3
28D2	Greenton silty clay loam, bedrock substratum, 9 to 14 percent slopes, eroded	16,265	4.7
30B	Sampsel silty clay loam, 1 to 5 percent slopes	3,496	1.0
34B2	Lagonda silty clay loam, 2 to 5 percent slopes, eroded	51,792	15.0
34C2	Lagonda silty clay loam, 5 to 9 percent slopes, eroded	60,120	17.4
36D2	Lamoni loam, 9 to 14 percent slopes, eroded	4,164	1.2
62D2	Caleb silt loam, 9 to 14 percent slopes, eroded	3,738	1.1
70C2	Dawn loam, 5 to 9 percent slopes, eroded	2,114	0.6
72F	Gosport silt loam, 14 to 35 percent slopes	10,000	2.9
73	Sandover loam, frequently flooded	580	0.2
74	Dockery silt loam, frequently flooded	22,425	6.5
78	Colo silt loam, occasionally flooded	7,297	2.1
80	Tice silt loam, overwash, frequently flooded	9,787	2.8
81	Tice silty clay, overwash, occasionally flooded	2,778	0.8
82A	Triplett silt loam, 1 to 3 percent slopes, rarely flooded	793	0.2
84	Vesser silt loam, occasionally flooded	13,278	3.8
92	Carlow silty clay, frequently flooded	33,665	9.8
94	Zook silty clay loam, overwash, frequently flooded	10,507	3.0
98	Wabash silty clay, frequently flooded	13,298	3.9
99F	Putco-Pits-Dumps complex, 9 to 50 percent slopes	772	0.2
99002	Orthents, borrow areas, clayey	25	*
99005	Orthents, landfill	30	*
M-W	Miscellaneous water	25	*
W	Water	1,703	0.5
	Total	345,094	100.0

* Less than 0.1 percent.

Table 5.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
10A	Sturges silt loam, 0 to 3 percent slopes (where drained)
12A	Crestmeade silt loam, 0 to 3 percent slopes (where drained)
14B	Grundy silt loam, 2 to 5 percent slopes
21B	Weller silt loam, bench, 2 to 7 percent slopes
30B	Sampsel silty clay loam, 1 to 5 percent slopes (where drained)
34B2	Lagonda silt loam, 2 to 5 percent slopes, eroded
73	Sandover loam, frequently flooded
74	Dockery silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
78	Colo silt loam, occasionally flooded (where drained)
80	Tice silt loam, overwash, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
81	Tice silty clay, overwash, occasionally flooded
82A	Triplett silt loam, 1 to 3 percent slopes, rarely flooded (where drained)
84	Vesser silt loam, occasionally flooded (where drained)
92	Carlow silty clay, frequently flooded (where drained)
94	Zook silty clay loam, overwash, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
98	Wabash silty clay, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)

Table 6.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Corn	Grain sorghum	Grass-legume hay	Grass-legume pasture	Soybeans	Winter wheat
		Bu	Bu	Tons	Tons	Bu	Bu
10A:							
Sturges	2w	117	88	4.0	6.0	39	47
12A:							
Crestmeade	2w	117	88	4.0	6.0	39	47
14B:							
Grundy	2e	111	83	4.0	6.0	37	44
20F:							
Locksprings	6s	---	---	0.8	1.1	---	---
21B:							
Weller	3e	100	75	4.0	5.0	33	40
22C:							
Weller	3e	94	71	3.0	5.0	31	38
26C2:							
Chillicothe	3e	94	71	3.0	5.0	31	38
28C:							
Greenton	3e	106	79	4.0	5.0	35	42
28D2:							
Greenton	6e	92	69	3.0	5.0	31	37
30B:							
Sampsel	2e	100	75	4.0	5.0	33	40
34B2:							
Lagonda	3e	106	79	4.0	5.0	35	42
34C2:							
Lagonda	3e	100	75	4.0	5.0	33	40
36D2:							
Lamoni	4e	86	65	3.0	4.0	29	34
62D2:							
Caleb	4e	108	81	4.0	5.0	36	43
70C2:							
Dawn	4e	64	48	2.0	3.0	21	26
72F:							
Gosport	7e	---	---	1.5	2.1	---	---
73:							
Sandover	2w	67	50	2.0	3.0	22	27
74:							
Dockery	3w	106	79	4.0	5.0	35	42
78:							
Colo	2w	117	88	4.0	6.0	39	47

Table 6.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Grain sorghum	Grass-legume hay	Grass-legume pasture	Soybeans	Winter wheat
		Bu	Bu	Tons	Tons	Bu	Bu
80:							
Tice	3w	111	83	4.0	6.0	37	44
81:							
Tice	2w	128	96	4.0	6.0	43	51
82A:							
Triplett	2w	117	88	4.0	6.0	39	47
84:							
Vesser	2w	106	79	4.0	5.0	35	42
92:							
Carlow	3w	72	54	2.0	4.0	24	29
94:							
Zook	3w	78	58	3.0	4.0	26	31
98:							
Wabash	4w	67	50	2.0	3.0	22	27
99F:							
Putco	6e	---	---	2.3	3.3	---	---
Pits	8s	---	---	---	---	---	---
Dumps.							
99002, 99005:							
Orthents.							
M-W:							
Miscellaneous water.							
W:							
Water.							

Table 7.--Pasture and Hayland Suitability Groups

(See text for descriptions of the groups listed in this table)

Map symbol	Map unit name	Component name	Pasture and hayland group
10A	Sturges silt loam, 0 to 3 percent slopes	Sturges	WCU
12A	Crestmeade silt loam, 0 to 3 percent slopes	Crestmeade	CyU
14B	Grundy silt loam, 2 to 5 percent slopes	Grundy	CyU
20F	Locksprings silty clay loam, 9 to 30 percent slopes	Locksprings	MDU
21B	Weller silt loam, bench, 2 to 7 percent slopes	Weller	CyU
22C	Weller silt loam, 3 to 9 percent slopes	Weller	CyU
26C2	Chillicothe silty clay loam, 5 to 9 percent slopes, eroded	Chillicothe	CyU
28C	Greenton silty clay loam, 5 to 9 percent slopes	Greenton	CyU
28D2	Greenton silty clay loam, bedrock substratum, 9 to 14 percent slopes, eroded	Greenton	CyU
30B	Sampsel silty clay loam, 1 to 5 percent slopes	Sampsel	WCU
34B2	Lagonda silty clay loam, 2 to 5 percent slopes, eroded	Lagonda	CyU
34C2	Lagonda silty clay loam, 5 to 9 percent slopes, eroded	Lagonda	CyU
36D2	Lamoni loam, 9 to 14 percent slopes, eroded	Lamoni	CyU
62D2	Caleb silt loam, 9 to 14 percent slopes, eroded	Caleb	LyU
70C2	Dawn loam, 5 to 9 percent slopes, eroded	Dawn	LyU
72F	Gosport silt loam, 14 to 35 percent slopes	Gosport	MDU
73	Sandover loam, frequently flooded	Sandover	SyO
74	Dockery silt loam, frequently flooded	Dockery	WLO
78	Colo silt loam, occasionally flooded	Colo	WLB
80	Tice silt loam, overwash, frequently flooded	Tice	WLO
81	Tice silty clay, overwash, occasionally flooded	Tice	WLO
82A	Triplett silt loam, 1 to 3 percent slopes, rarely flooded	Triplett	WCB
84	Vesser silt loam, occasionally flooded	Vesser	WLB
92	Carlow silty clay, frequently flooded	Carlow	WCB
94	Zook silty clay loam, overwash, frequently flooded	Zook	WCB
98	Wabash silty clay, frequently flooded	Wabash	WCB
99F	Putco-Pits-Dumps complex, 9 to 50 percent slopes	Putco	CyU
		Pits	---
		Dumps	---
99002	Orthents, borrow areas, clayey	Orthents	---
99005	Orthents, landfill	Orthents	---
M-W	Miscellaneous water	Miscellaneous water	---
W	Water	Water	---

Table 8.--Forest Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber*	
21B:				
Weller	White oak	55	43	White oak, black oak, northern red oak.
	Black oak	---	---	
	Northern red oak	---	---	
22C:				
Weller	White oak	55	43	White oak, black oak, northern red oak.
	Black oak	---	---	
	Northern red oak	---	---	
62D2:				
Caleb	Northern red oak	55	43	Northern red oak, white oak.
	White oak	55	43	
72F:				
Gosport	Post oak	45	29	Black oak, eastern redcedar.
	Black oak	---	---	
	Hickory	---	---	
73:				
Sandover	Eastern cottonwood	85	86	Eastern cottonwood, green ash, silver maple.
	Pin oak	75	57	
	Willow	---	---	
74:				
Dockery	Pin oak	76	57	Eastern cottonwood, pecan, pin oak.
	Silver maple	---	---	
	Eastern cottonwood	---	---	
80:				
Tice	Eastern cottonwood	---	---	American sycamore, eastern cottonwood, green ash.
	Pin oak	96	72	
	Green ash	---	---	
81:				
Tice	Eastern cottonwood	---	---	American sycamore, eastern cottonwood, green ash.
	Pin oak	90	72	
	Green ash	---	---	
92:				
Carlow	Eastern cottonwood	85	86	Eastern cottonwood, green ash, pecan, pin oak, silver maple.
	Pin oak	75	57	
	Silver maple	---	---	
98:				
Wabash	Pin oak	75	57	Eastern cottonwood, pecan, pin oak.
	Eastern cottonwood	---	---	
	Pecan	---	---	

See footnote at end of table.

Table 8.--Forest Productivity--Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber*	
99F:				
Putco	American elm	---	---	Cottonwood, eastern redcedar.
	Cottonwood	---	29	
	River birch	---	---	
Pits.				
Dumps.				

* Volume of wood fiber is the yield in cubic feet per acre per year calculated at the age of culmination of the mean annual increment for fully stocked, even-aged, unmanaged stands.

Table 9a.--Forestland Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10A:										
Sturges	Moderately limited: seasonal wetness (moderately limited)	0.60	Moderately limited: seasonal wetness (moderately limited)	0.60	Limited: low strength (limited)	0.70	Limited: seasonal wetness (limited)	0.62	Limited: low strength (limited)	0.70
					seasonal wetness (limited)	0.62			seasonal wetness (limited)	0.62
									slippage potential (moderately limited)	0.50
12A:										
Crestmeade	Moderately limited: seasonal wetness (moderately limited)	0.60	Moderately limited: seasonal wetness (moderately limited)	0.60	Limited: low strength (limited)	0.70	Limited: seasonal wetness (limited)	0.62	Limited: low strength (limited)	0.70
					seasonal wetness (limited)	0.62			seasonal wetness (limited)	0.62
									slippage potential (moderately limited)	0.50
14B:										
Grundy	Moderately limited: stickiness (surface) (moderately limited)	0.50	Moderately limited: stickiness (surface) (moderately limited)	0.50	Limited: low strength (limited)	0.70	Moderately limited: stickiness (surface) (moderately limited)	0.50	Limited: low strength (limited)	0.70
					stickiness (surface) (moderately limited)	0.50	seasonal wetness (slightly limited)	0.29	slippage potential (moderately limited)	0.50
					seasonal wetness (slightly limited)	0.29			stickiness (surface) (moderately limited)	0.50
20F:										
Locksprings	Moderately limited: stickiness (surface) (moderately limited)	0.50	Moderately limited: stickiness (surface) (moderately limited)	0.50	Limited: low strength (limited)	0.70	Moderately limited: stickiness (surface) (moderately limited)	0.50	Limited: low strength (limited)	0.70
			slope (moderately limited)	0.43	stickiness (surface) (moderately limited)	0.50	seasonal wetness (slightly limited)	0.29	slope (limited)	0.67
			large stones (slightly limited)	0.01	seasonal wetness (slightly limited)	0.29			slippage potential (moderately limited)	0.50
21B:										
Weller	Not limited		Not limited		Limited: low strength (limited)	0.70	Slightly limited: seasonal wetness (slightly limited)	0.20	Limited: low strength (limited)	0.70
					seasonal wetness (slightly limited)	0.20			slippage potential (moderately limited)	0.50

Table 9a.--Forestland Management--Continued

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
22C:										
Weller--------	Not limited		Slightly limited:		Limited:		Slightly limited:		Limited:	
			slope	0.11	low strength	0.70	seasonal wetness	0.20	low strength	0.70
			(slightly limited)		(limited)		(slightly limited)		(limited)	
					seasonal wetness	0.20			slippage potential	0.50
					(slightly limited)				(moderately limited)	
									seasonal wetness	0.20
									(slightly limited)	
26C2:										
Chillicothe---	Moderately limited:		Moderately limited:		Limited:		Moderately limited:		Limited:	
	stickiness (surface)	0.50	stickiness (surface)	0.50	low strength	0.70	stickiness (surface)	0.50	low strength	0.70
	(moderately limited)		(moderately limited)		(limited)		(moderately limited)		(limited)	
			slope	0.20	stickiness (surface)	0.50	seasonal wetness	0.20	slippage potential	0.50
			(slightly limited)		(moderately limited)		(slightly limited)		(moderately limited)	
					seasonal wetness	0.20			stickiness (surface)	0.50
					(slightly limited)				(moderately limited)	
28C:										
Greenton------	Moderately limited:		Moderately limited:		Limited:		Moderately limited:		Limited:	
	stickiness (surface)	0.50	stickiness (surface)	0.50	low strength	0.70	seasonal wetness	0.56	low strength	0.70
	(moderately limited)		(moderately limited)		(limited)		(moderately limited)		(limited)	
			slope	0.20	seasonal wetness	0.56	stickiness (surface)	0.50	seasonal wetness	0.56
			(slightly limited)		(moderately limited)		(moderately limited)		(moderately limited)	
					stickiness (surface)	0.50			slippage potential	0.50
					(moderately limited)				(moderately limited)	
28D2:										
Greenton------	Moderately limited:		Moderately limited:		Limited:		Limited:		Limited:	
	seasonal wetness	0.60	seasonal wetness	0.60	low strength	0.70	seasonal wetness	0.62	low strength	0.70
	(moderately limited)		(moderately limited)		(limited)		(limited)		(limited)	
	stickiness (surface)	0.50	stickiness (surface)	0.50	seasonal wetness	0.62	stickiness (surface)	0.50	seasonal wetness	0.62
	(moderately limited)		(moderately limited)		(limited)		(moderately limited)		(limited)	
			slope	0.39	stickiness (surface)	0.50			slope	0.59
			(moderately limited)		(moderately limited)				(moderately limited)	
30B:										
Sampsel-------	Moderately limited:		Moderately limited:		Limited:		Limited:		Limited:	
	seasonal wetness	0.60	seasonal wetness	0.60	seasonal wetness	0.85	seasonal wetness	0.85	slippage potential	0.90
	(moderately limited)		(moderately limited)		(limited)		(limited)		(limited)	
	stickiness (surface)	0.50	stickiness (surface)	0.50	low strength	0.70	stickiness (surface)	0.50	seasonal wetness	0.85
	(moderately limited)		(moderately limited)		(limited)		(moderately limited)		(limited)	

Table 9a.--Forestland Management--Continued

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
34B2:										
Lagonda--------	Not limited		Not limited		Limited: low strength (limited) seasonal wetness (slightly limited) low strength (slightly limited)	0.70 0.29 0.12	Slightly limited: seasonal wetness (slightly limited)	0.29	Limited: low strength (limited) slippage potential (moderately limited) seasonal wetness (slightly limited)	0.70 0.50 0.29
34C2:										
Lagonda--------	Moderately limited: stickiness (surface) (moderately limited)	0.50	Moderately limited: stickiness (surface) (moderately limited) slope (slightly limited)	0.50 0.20	Limited: low strength (limited) stickiness (surface) (moderately limited) seasonal wetness (slightly limited)	0.70 0.50 0.29	Moderately limited: stickiness (surface) (moderately limited) seasonal wetness (slightly limited)	0.50 0.29	Limited: low strength (limited) slippage potential (moderately limited) stickiness (surface) (moderately limited)	0.70 0.50 0.50
36D2:										
Lamoni---------	Moderately limited: seasonal wetness (moderately limited)	0.60	Moderately limited: seasonal wetness (moderately limited) slope (moderately limited)	0.60 0.34	Limited: low strength (limited) seasonal wetness (limited)	0.70 0.62	Limited: seasonal wetness (limited)	0.62	Limited: low strength (limited) seasonal wetness (limited) slope (moderately limited)	0.70 0.62 0.44
62D2:										
Caleb----------	Not limited		Moderately limited: slope (moderately limited)	0.39	Limited: low strength (limited)	0.70	Not limited		Limited: low strength (limited) slope (moderately limited)	0.70 0.59
70C2:										
Dawn----------	Not limited		Slightly limited: slope (slightly limited)	0.30	Limited: low strength (limited) seasonal wetness (slightly limited)	0.70 0.29	Slightly limited: seasonal wetness (slightly limited)	0.29	Limited: low strength (limited) slippage potential (moderately limited) seasonal wetness (slightly limited)	0.70 0.50 0.29

Table 9a.--Forestland Management--Continued

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
72F:										
Gosport-------	Slightly limited: slope (slightly limited)	0.24	Limited: slope (limited)	0.91	Limited: low strength (limited)	0.70	Moderately limited: slope (moderately limited)	0.48	Very limited: slope >15% (very limited)	1.00
					slope (moderately limited)	0.48			low strength (limited)	0.70
									slippage potential (moderately limited)	0.50
73:										
Sandover------	Not limited		Not limited		Limited: low strength (limited)	0.70	Slightly limited: seasonal wetness (slightly limited)	0.16	Very limited: flooding (very limited)	1.00
					seasonal wetness (slightly limited)	0.16			low strength (limited)	0.70
									seasonal wetness (slightly limited)	0.16
74:										
Dockery-------	Not limited		Not limited		Limited: low strength (limited)	0.70	Slightly limited: seasonal wetness (slightly limited)	0.29	Very limited: flooding (very limited)	1.00
					seasonal wetness (slightly limited)	0.29			low strength (limited)	0.70
									seasonal wetness (slightly limited)	0.29
78:										
Colo----------	Moderately limited: seasonal wetness (moderately limited)	0.60	Moderately limited: seasonal wetness (moderately limited)	0.60	Limited: low strength (limited)	0.70	Limited: seasonal wetness (limited)	0.62	Limited: low strength (limited)	0.70
					seasonal wetness (limited)	0.62			seasonal wetness (limited)	0.62
									flooding (moderately limited)	0.60
80:										
Tice----------	Moderately limited: seasonal wetness (moderately limited)	0.60	Moderately limited: seasonal wetness (moderately limited)	0.60	Limited: low strength (limited)	0.70	Limited: seasonal wetness (limited)	0.62	Very limited: flooding (very limited)	1.00
					seasonal wetness (limited)	0.62			low strength (limited)	0.70
									seasonal wetness (limited)	0.62

Table 9a.--Forestland Management--Continued

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
81:										
Tice----------	Moderately limited:		Moderately limited:		Moderately limited:		Moderately limited:		Moderately limited:	
	stickiness (surface)	0.50	stickiness (surface)	0.50	low strength	0.51	stickiness (surface)	0.50	flooding	0.60
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
					stickiness (surface)	0.50	seasonal wetness	0.39	low strength	0.51
					(moderately limited)		(moderately limited)		(moderately limited)	
					seasonal wetness	0.39			stickiness (surface)	0.50
					(moderately limited)				(moderately limited)	
82A:										
Triplett------	Moderately limited:		Moderately limited:		Limited:		Limited:		Limited:	
	seasonal wetness	0.60	seasonal wetness	0.60	seasonal wetness	0.81	seasonal wetness	0.81	seasonal wetness	0.81
	(moderately limited)		(moderately limited)		(limited)		(limited)		(limited)	
					low strength	0.70			low strength	0.70
					(limited)				(limited)	
84:										
Vesser--------	Moderately limited:		Moderately limited:		Limited:		Limited:		Limited:	
	seasonal wetness	0.60	seasonal wetness	0.60	seasonal wetness	0.91	seasonal wetness	0.91	seasonal wetness	0.91
	(moderately limited)		(moderately limited)		(limited)		(limited)		(limited)	
					low strength	0.70			low strength	0.70
					(limited)				(limited)	
									flooding	0.60
									(moderately limited)	
92:										
Carlow--------	Limited:		Limited:		Limited:		Limited:		Very limited:	
	stickiness (surface)	0.75	stickiness (surface)	0.75	stickiness (surface)	0.75	stickiness (surface)	0.75	flooding	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	seasonal wetness	0.60	seasonal wetness	0.60	seasonal wetness	0.66	seasonal wetness	0.66	stickiness (surface)	0.75
	(moderately limited)		(moderately limited)		(limited)		(limited)		(limited)	
					low strength	0.52			seasonal wetness	0.66
					(moderately limited)				(limited)	
94:										
Zook----------	Moderately limited:		Moderately limited:		Very limited:		Very limited:		Very limited:	
	seasonal wetness	0.60	seasonal wetness	0.60	seasonal wetness	1.00	seasonal wetness	1.00	flooding	1.00
	(moderately limited)		(moderately limited)		(very limited)		(very limited)		(very limited)	
	stickiness (surface)	0.50	stickiness (surface)	0.50	low strength	0.70	stickiness (surface)	0.50	seasonal wetness	1.00
	(moderately limited)		(moderately limited)		(limited)		(moderately limited)		(very limited)	
					stickiness (surface)	0.50			low strength	0.70
					(moderately limited)				(limited)	

Table 9a.--Forestland Management--Continued

Map symbol and soil name	Hand planting		Mechanical planting		Use of harvesting equipment		Mechanical site preparation (surface)		Roads (natural surface)	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
98:										
Wabash	Limited: stickiness (surface) (limited) seasonal wetness (moderately limited)	0.75 0.60	Limited: stickiness (surface) (limited) seasonal wetness (moderately limited)	0.75 0.60	Limited: seasonal wetness (limited) stickiness (surface) (limited) low strength (limited)	0.91 0.75 0.65	Limited: seasonal wetness (limited) stickiness (surface) (limited)	0.91 0.75	Very limited: flooding (very limited) seasonal wetness (limited) stickiness (surface) (limited)	1.00 0.91 0.75
99F:										
Putco	Moderately limited: stickiness (surface) (moderately limited)	0.50	Moderately limited: stickiness (surface) (moderately limited) slope (moderately limited)	0.50 0.43	Moderately limited: stickiness (surface) (moderately limited) low strength (moderately limited)	0.50 0.45	Moderately limited: stickiness (surface) (moderately limited)	0.50	Limited: slope (limited) stickiness (surface) (moderately limited) low strength (moderately limited)	0.67 0.50 0.45
Pits	Not rated		Not rated		Not rated		Not rated		Not rated	
Dumps	Not rated		Not rated		Not rated		Not rated		Not rated	
99002:										
Orthents	Moderately limited: stickiness (surface) (moderately limited)	0.50	Moderately limited: stickiness (surface) (moderately limited)	0.50	Moderately limited: stickiness (surface) (moderately limited) low strength (slightly limited)	0.50 0.05	Moderately limited: stickiness (surface) (moderately limited)	0.50	Moderately limited: stickiness (surface) (moderately limited) low strength (slightly limited)	0.50 0.05
99005:										
Orthents	Not rated		Not rated		Not rated		Not rated		Not rated	
M-W:										
Miscellaneous water	Not rated		Not rated		Not rated		Not rated		Not rated	
W:										
Water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 9b.--Forestland Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10A:										
Sturges	Slightly limited: slope/erodibility (slightly limited)	0.22	Slightly limited: slope/erodibility (slightly limited)	0.05	Limited: low strength (limited) seasonal wetness (limited)	0.70 0.62	Limited: low strength (limited) seasonal wetness (limited) slippage potential (moderately limited)	0.70 0.62 0.50	Limited: seasonal wetness (limited)	0.62
12A:										
Crestmeade	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: low strength (limited) seasonal wetness (limited)	0.70 0.62	Limited: low strength (limited) seasonal wetness (limited) slippage potential (moderately limited)	0.70 0.62 0.50	Limited: seasonal wetness (limited)	0.62
14B:										
Grundy	Moderately limited: slope/erodibility (moderately limited)	0.44	Slightly limited: slope/erodibility (slightly limited)	0.10	Limited: low strength (limited) seasonal wetness (slightly limited)	0.70 0.29	Limited: low strength (limited) slippage potential (moderately limited) stickiness (surface) (moderately limited)	0.70 0.50 0.50	Not limited	
20F:										
Locksprings	Limited: slope/erodibility (limited)	0.69	Slightly limited: slope/erodibility (slightly limited)	0.22	Limited: low strength (limited) seasonal wetness (slightly limited)	0.70 0.29	Limited: low strength (limited) slope (limited) slippage potential (moderately limited)	0.70 0.67 0.50	Not limited	

Table 9b.--Forestland Management--Continued

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
21B:										
Weller--------	Moderately limited: slope/erodibility (moderately limited)	0.44	Slightly limited: slope/erodibility (slightly limited)	0.10	Limited: low strength (limited) seasonal wetness (slightly limited)	0.70 0.20	Limited: low strength (limited) slippage potential (moderately limited) seasonal wetness (slightly limited)	0.70 0.50 0.20	Not limited	
22C:										
Weller--------	Limited: slope/erodibility (limited)	0.67	Slightly limited: slope/erodibility (slightly limited)	0.15	Limited: low strength (limited) seasonal wetness (slightly limited)	0.70 0.20	Limited: low strength (limited) slippage potential (moderately limited) seasonal wetness (slightly limited)	0.70 0.50 0.20	Not limited	
26C2:										
Chillicothe---	Limited: slope/erodibility (limited)	0.78	Slightly limited: slope/erodibility (slightly limited)	0.17	Limited: low strength (limited) seasonal wetness (slightly limited)	0.70 0.20	Limited: low strength (limited) slippage potential (moderately limited) stickiness (surface) (moderately limited)	0.70 0.50 0.50	Not limited	
28C:										
Greenton------	Limited: slope/erodibility (limited)	0.78	Slightly limited: slope/erodibility (slightly limited)	0.17	Limited: low strength (limited) seasonal wetness (moderately limited)	0.70 0.56	Limited: low strength (limited) seasonal wetness (moderately limited) slippage potential (moderately limited)	0.70 0.56 0.50	Moderately limited: seasonal wetness (moderately limited)	0.51
28D2:										
Greenton------	Very limited: slope/erodibility (very limited)	1.00	Slightly limited: slope/erodibility (slightly limited)	0.20	Limited: low strength (limited) seasonal wetness (limited)	0.70 0.62	Limited: low strength (limited) seasonal wetness (limited) slope (moderately limited)	0.70 0.62 0.59	Limited: seasonal wetness (limited)	0.62

Table 9b.--Forestland Management--Continued

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
30B:										
Sampsel	Moderately limited: slope/erodibility (moderately limited)	0.44	Slightly limited: slope/erodibility (slightly limited)	0.08	Limited: seasonal wetness (limited)	0.85	Limited: slippage potential (limited)	0.90	Limited: seasonal wetness (limited)	0.85
					low strength (limited)	0.70	seasonal wetness (limited)	0.85		
							low strength (limited)	0.70		
34B2:										
Lagonda	Moderately limited: slope/erodibility (moderately limited)	0.44	Slightly limited: slope/erodibility (slightly limited)	0.10	Limited: low strength (limited)	0.70	Limited: low strength (limited)	0.70	Not limited	
					seasonal wetness (slightly limited)	0.29	slippage potential (moderately limited)	0.50		
							seasonal wetness (slightly limited)	0.29		
34C2:										
Lagonda	Limited: slope/erodibility (limited)	0.78	Slightly limited: slope/erodibility (slightly limited)	0.17	Limited: low strength (limited)	0.70	Limited: low strength (limited)	0.70	Not limited	
					seasonal wetness (slightly limited)	0.29	slippage potential (moderately limited)	0.50		
							stickiness (surface) (moderately limited)	0.50		
36D2:										
Lamoni	Very limited: slope/erodibility (very limited)	1.00	Slightly limited: slope/erodibility (slightly limited)	0.18	Limited: low strength (limited)	0.70	Limited: low strength (limited)	0.70	Limited: seasonal wetness (limited)	0.62
					seasonal wetness (limited)	0.62	seasonal wetness (limited)	0.62		
							slope (moderately limited)	0.44		
62D2:										
Caleb	Very limited: slope/erodibility (very limited)	1.00	Slightly limited: slope/erodibility (slightly limited)	0.24	Limited: low strength (limited)	0.70	Limited: low strength (limited)	0.70	Not limited	
							slope (moderately limited)	0.59		

Table 9b.--Forestland Management--Continued

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70C2:										
Dawn----------	Limited: slope/erodibility (limited)	0.89	Slightly limited: slope/erodibility (slightly limited)	0.16	Limited: low strength (limited)	0.70	Limited: low strength (limited)	0.70	Not limited	
					seasonal wetness (slightly limited)	0.29	slippage potential (moderately limited)	0.50		
							seasonal wetness (slightly limited)	0.29		
72F:										
Gosport-------	Very limited: slope/erodibility (very limited)	1.00	Moderately limited: slope/erodibility (moderately limited)	0.56	Limited: low strength (limited)	0.70	Very limited: slope >15% (very limited)	1.00	Not limited	
							low strength (limited)	0.70		
							slippage potential (moderately limited)	0.50		
73:										
Sandover------	Slightly limited: slope/erodibility (slightly limited)	0.06	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: low strength (limited)	0.70	Very limited: flooding (very limited)	1.00	Limited: flooding (limited)	0.90
					seasonal wetness (slightly limited)	0.16	low strength (limited)	0.70	droughty (slightly limited)	0.02
							seasonal wetness (slightly limited)	0.16		
74:										
Dockery-------	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: low strength (limited)	0.70	Very limited: flooding (very limited)	1.00	Limited: flooding (limited)	0.90
					seasonal wetness (slightly limited)	0.29	low strength (limited)	0.70		
							seasonal wetness (slightly limited)	0.29		
78:										
Colo----------	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: low strength (limited)	0.70	Limited: low strength (limited)	0.70	Limited: seasonal wetness (limited)	0.62
					seasonal wetness (limited)	0.62	seasonal wetness (limited)	0.62	flooding (moderately limited)	0.60
							flooding (moderately limited)	0.60		

Table 9b.--Forestland Management--Continued

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
80:										
Tice----------	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: low strength (limited)	0.70	Very limited: flooding (very limited)	1.00	Limited: flooding (limited)	0.90
					seasonal wetness (limited)	0.62	low strength (limited)	0.70	seasonal wetness (limited)	0.62
							seasonal wetness (limited)	0.62		
81:										
Tice----------	Slightly limited: slope/erodibility (slightly limited)	0.06	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: low strength (limited)	0.70	Moderately limited: flooding (moderately limited)	0.60	Moderately limited: flooding (moderately limited)	0.60
					seasonal wetness (moderately limited)	0.39	low strength (moderately limited)	0.51	seasonal wetness (slightly limited)	0.19
							stickiness (surface) (moderately limited)	0.50		
82A:										
Triplett------	Slightly limited: slope/erodibility (slightly limited)	0.22	Slightly limited: slope/erodibility (slightly limited)	0.05	Limited: seasonal wetness (limited)	0.81	Limited: seasonal wetness (limited)	0.81	Limited: seasonal wetness (limited)	0.81
					low strength (limited)	0.70	low strength (limited)	0.70		
84:										
Vesser--------	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: seasonal wetness (limited)	0.91	Limited: seasonal wetness (limited)	0.91	Limited: seasonal wetness (limited)	0.91
					low strength (limited)	0.70	low strength (limited)	0.70	flooding (moderately limited)	0.60
							flooding (moderately limited)	0.60		
92:										
Carlow--------	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Limited: low strength (limited)	0.70	Very limited: flooding (very limited)	1.00	Limited: flooding (limited)	0.90
					seasonal wetness (limited)	0.66	stickiness (surface) (limited)	0.75	seasonal wetness (limited)	0.66
							seasonal wetness (limited)	0.66		

Table 9b.--Forestland Management--Continued

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
94:										
Zook----------	Slightly limited: slope/erodibility (slightly limited)	0.11	Slightly limited: slope/erodibility (slightly limited)	0.02	Very limited: seasonal wetness (very limited)	1.00	Very limited: flooding (very limited)	1.00	Very limited: seasonal wetness (very limited)	1.00
					low strength (limited)	0.70	seasonal wetness (very limited)	1.00	flooding (limited)	0.90
							low strength (limited)	0.70		
98:										
Wabash--------	Not limited		Not limited		Limited: seasonal wetness (limited)	0.91	Very limited: flooding (very limited)	1.00	Limited: seasonal wetness (limited)	0.91
					low strength (limited)	0.70	seasonal wetness (limited)	0.91	flooding (limited)	0.90
							stickiness (surface) (limited)	0.75		
99F:										
Putco----------	Very limited: slope/erodibility (very limited)	1.00	Slightly limited: slope/erodibility (slightly limited)	0.22	Limited: low strength (limited)	0.70	Limited: slope (limited)	0.67	Not limited	
							stickiness (surface) (moderately limited)	0.50		
							low strength (moderately limited)	0.45		
Pits----------	Not rated		Not rated		Not rated		Not rated		Not rated	
Dumps---------	Not rated		Not rated		Not rated		Not rated		Not rated	
99002:										
Orthents------	Moderately limited: slope/erodibility (moderately limited)	0.44	Slightly limited: slope/erodibility (slightly limited)	0.08	Not limited		Moderately limited: stickiness (surface) (moderately limited)	0.50	Very limited: soil reaction (very limited)	1.00
							low strength (slightly limited)	0.05		
99005:										
Orthents------	Not rated		Not rated		Not rated		Not rated		Not rated	
M-W:										
Miscellaneous water--------	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 9b.--Forestland Management--Continued

Map symbol and soil name	Erosion on roads and trails		Off-road or off-trail erosion		Soil rutting		Log landings		Seedling survival	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
W:										
Water---------	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 10.--Windbreaks and Environmental Plantings

(Only the soils suitable for windbreaks and environmental plantings are listed. Absence of an entry indicates that trees generally do not grow to the given height)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
12A:					
Crestmeade	Fragrant sumac, ninebark.	Gray dogwood, possumhaw, Amur maple.	Eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak.	---
14B:					
Grundy	Fragrant sumac, ninebark.	Gray dogwood, possumhaw, Amur maple.	Eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak.	---
20F:					
Locksprings	Fragrant sumac, common lilac.	Washington hawthorn, eastern redcedar, radiant crabapple.	Austrian pine, red pine, eastern white pine.	---	---
62D2:					
Caleb	Silky dogwood	American cranberrybush, Amur honeysuckle.	Washington hawthorn, blue spruce, eastern arborvitae, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
70C2:					
Dawn	Fragrant sumac	Common lilac, Amur maple, eastern redcedar.	Common hackberry	Norway spruce, green ash, red pine, eastern white pine.	---
78:					
Colo	Buttonbush	Possumhaw	Nannyberry, eastern arborvitae, eastern redcedar.	Common hackberry, baldcypress, pin oak.	Eastern cottonwood.
80:					
Tice	American plum, fragrant sumac.	Blackhaw, gray dogwood.	Washington hawthorn, nannyberry, eastern redcedar.	Baldcypress, green ash, sweetgum.	Eastern white pine, pin oak.

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
82A:					
Triplett	Fragrant sumac, ninebark.	Gray dogwood, possumhaw, Amur maple.	Eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak.	---
92:					
Carlow	Buttonbush	Possumhaw	Nannyberry, eastern arborvitae, eastern redcedar.	Common hackberry, baldcypress, pin oak.	Eastern cottonwood.
98:					
Wabash	Buttonbush	Possumhaw	Nannyberry, eastern arborvitae, eastern redcedar.	Common hackberry, baldcypress, pin oak.	Eastern cottonwood.
99F:					
Putco	Fragrant sumac	Washington hawthorn, eastern redbud, wahoo.	Virginia pine, eastern redcedar, green ash.	---	Eastern cottonwood.
Pits.					
Dumps.					

Table 11.--Recreational Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10A:								
Sturges	Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.76	percs slowly	0.76	percs slowly	0.76		
	(limited)		(limited)		(limited)			
					slope	0.02		
					(slightly limited)			
12A:								
Crestmeade	Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.60	percs slowly	0.60	percs slowly	0.60		
	(moderately limited)		(moderately limited)		(moderately limited)			
14B:								
Grundy	Limited:		Limited:		Limited:		Limited:	
	wetness	0.97	percs slowly	0.76	wetness	0.97	wetness	0.60
	(limited)		(limited)		(limited)		(limited)	
	percs slowly	0.76	wetness	0.60	percs slowly	0.76		
	(limited)		(limited)		(limited)			
					slope	0.50		
					(moderately limited)			
20F:								
Locksprings	Limited:		Limited:		Very limited:		Limited:	
	wetness	0.97	wetness	0.60	slope >6%	1.00	wetness	0.60
	(limited)		(limited)		(very limited)		(limited)	
	too clayey	0.60	too clayey	0.60	wetness	0.97	too clayey	0.60
	(moderately limited)		(moderately limited)		(limited)		(moderately limited)	
	slope	0.37	slope	0.37	too clayey	0.60		
	(moderately limited)		(moderately limited)		(moderately limited)			
21B:								
Weller	Moderately limited:		Slightly limited:		Moderately limited:		Slightly limited:	
	wetness	0.60	wetness	0.28	wetness	0.60	wetness	0.28
	(moderately limited)		(slightly limited)		(moderately limited)		(slightly limited)	
					slope	0.50		
					(moderately limited)			

Table 11.--Recreational Site Development--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
22C:								
Weller	Limited:		Limited:		Limited:		Slightly limited:	
	percs slowly (limited)	0.76	percs slowly (limited)	0.76	slope (limited)	0.98	wetness (slightly limited)	0.28
	wetness (moderately limited)	0.60	wetness (slightly limited)	0.28	percs slowly (limited)	0.76		
					wetness (moderately limited)	0.60		
26C2:								
Chillicothe	Moderately limited:		Moderately limited:		Very limited:		Moderately limited:	
	percs slowly (moderately limited)	0.60	percs slowly (moderately limited)	0.60	slope >6% (very limited)	1.00	too clayey (moderately limited)	0.60
	wetness (moderately limited)	0.60	too clayey (moderately limited)	0.60	percs slowly (moderately limited)	0.60	wetness (slightly limited)	0.28
	too clayey (moderately limited)	0.60	wetness (slightly limited)	0.28	wetness (moderately limited)	0.60		
28C:								
Greenton	Very limited:		Limited:		Very limited:		Limited:	
	wetness (very limited)	1.00	wetness (limited)	0.94	slope >6% (very limited)	1.00	wetness (limited)	0.94
	percs slowly (limited)	0.76	percs slowly (limited)	0.76	wetness (very limited)	1.00	too clayey (moderately limited)	0.60
	too clayey (moderately limited)	0.60	too clayey (moderately limited)	0.60	percs slowly (limited)	0.76		
28D2:								
Greenton	Very limited:		Very limited:		Very limited:		Very limited:	
	wetness (very limited)	1.00	wetness (very limited)	1.00	slope >6% (very limited)	1.00	wetness (very limited)	1.00
	percs slowly (limited)	0.76	percs slowly (limited)	0.76	wetness (very limited)	1.00	too clayey (moderately limited)	0.60
	too clayey (moderately limited)	0.60	too clayey (moderately limited)	0.60	percs slowly (limited)	0.76		
30B:								
Sampsel	Very limited:		Very limited:		Very limited:		Very limited:	
	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00
	percs slowly (moderately limited)	0.60	percs slowly (moderately limited)	0.60	percs slowly (moderately limited)	0.60	too clayey (moderately limited)	0.60
	too clayey (moderately limited)	0.60	too clayey (moderately limited)	0.60	too clayey (moderately limited)	0.60		

Table 11.--Recreational Site Development--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
34B2:								
Lagonda	Limited: wetness (limited) percs slowly (limited)	0.97 0.76	Limited: percs slowly (limited) wetness (limited)	0.76 0.60	Limited: wetness (limited) percs slowly (limited) slope (moderately limited)	0.97 0.76 0.50	Limited: wetness (limited)	0.60
34C2:								
Lagonda	Limited: wetness (limited) percs slowly (limited) too clayey (moderately limited)	0.97 0.76 0.30	Limited: percs slowly (limited) wetness (limited) too clayey (moderately limited)	0.76 0.60 0.30	Very limited: slope >6% (very limited) wetness (limited) percs slowly (limited)	1.00 0.97 0.76	Limited: wetness (limited) too clayey (moderately limited)	0.60 0.30
36D2:								
Lamoni	Very limited: percs slowly (very limited) wetness (very limited) slope (slightly limited)	1.00 1.00 0.04	Very limited: percs slowly (very limited) wetness (very limited) slope (slightly limited)	1.00 1.00 0.04	Very limited: slope >6% (very limited) percs slowly (very limited) wetness (very limited)	1.00 1.00 1.00	Very limited: wetness (very limited)	1.00
62D2:								
Caleb	Slightly limited: slope (slightly limited)	0.16	Slightly limited: slope (slightly limited)	0.16	Very limited: slope >6% (very limited)	1.00	Very limited: erodes easily (very limited)	1.00
70C2:								
Dawn	Limited: wetness (limited)	0.97	Limited: wetness (limited)	0.60	Very limited: slope >6% (very limited) wetness (limited) depth to bedrock (slightly limited)	1.00 0.97 0.09	Limited: wetness (limited)	0.60

Table 11.--Recreational Site Development--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
72F:								
Gosport	Very limited:		Very limited:		Very limited:		Very limited:	
	percs slowly	1.00	percs slowly	1.00	slope >6%	1.00	erodes easily	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	slope >15%	1.00	slope >15%	1.00	percs slowly	1.00	slope	0.79
	(very limited)		(very limited)		(very limited)		(limited)	
					depth to bedrock	0.03		
					(slightly limited)			
73:								
Sandover	Very limited:		Moderately limited:		Very limited:		Moderately limited:	
	flooding	1.00	flooding	0.60	flooding	1.00	flooding	0.60
	(very limited)		(moderately limited)		(very limited)		(moderately limited)	
	wetness	0.60	wetness	0.19	wetness	0.60	wetness	0.19
	(moderately limited)		(slightly limited)		(moderately limited)		(slightly limited)	
74:								
Dockery	Very limited:		Limited:		Very limited:		Limited:	
	flooding	1.00	wetness	0.60	flooding	1.00	wetness	0.60
	(very limited)		(limited)		(very limited)		(limited)	
	wetness	0.97	flooding	0.60	wetness	0.97	flooding	0.60
	(limited)		(moderately limited)		(limited)		(moderately limited)	
78:								
Colo	Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00			flooding	0.60		
	(very limited)				(moderately limited)			
80:								
Tice	Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	wetness	1.00	flooding	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00	flooding	0.60	wetness	1.00	flooding	0.60
	(very limited)		(moderately limited)		(very limited)		(moderately limited)	
81:								
Tice	Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	too clayey	1.00	wetness	1.00	too clayey	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00	wetness	0.73	too clayey	1.00	wetness	0.73
	(very limited)		(limited)		(very limited)		(limited)	
	too clayey	1.00	percs slowly	0.60	percs slowly	0.60		
	(very limited)		(moderately limited)		(moderately limited)			

Table 11.--Recreational Site Development--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
82A:								
Triplett	Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	flooding (rare)	0.90	percs slowly	0.76	percs slowly	0.76		
	(limited)		(limited)		(limited)			
	percs slowly	0.76			slope	0.02		
	(limited)				(slightly limited)			
84:								
Vesser	Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00			flooding	0.60		
	(very limited)				(moderately limited)			
92:								
Carlow	Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	wetness	1.00	flooding	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00	too clayey	1.00	wetness	1.00	too clayey	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	too clayey	1.00	percs slowly	0.76	too clayey	1.00	flooding	0.60
	(very limited)		(limited)		(very limited)		(moderately limited)	
94:								
Zook	Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	wetness	1.00	flooding	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00	percs slowly	0.60	wetness	1.00	flooding	0.60
	(very limited)		(moderately limited)		(very limited)		(moderately limited)	
	percs slowly	0.60	flooding	0.60	percs slowly	0.60	too clayey	0.60
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
98:								
Wabash	Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	wetness	1.00	flooding	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00	percs slowly	1.00	wetness	1.00	too clayey	1.00
	(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	1.00	too clayey	1.00	percs slowly	1.00	flooding	0.60
	(very limited)		(very limited)		(very limited)		(moderately limited)	

Table 11.--Recreational Site Development--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
99F:								
Putco	Limited:		Limited:		Very limited:		Moderately limited:	
	percs slowly (limited)	0.76	percs slowly (limited)	0.76	slope >6% (very limited)	1.00	too clayey (moderately limited)	0.60
	too clayey (moderately limited)	0.60	too clayey (moderately limited)	0.60	percs slowly (limited)	0.76		
	slope (moderately limited)	0.37	slope (moderately limited)	0.37	too clayey (moderately limited)	0.60		
Pits	Not rated		Not rated		Not rated		Not rated	
Dumps	Not rated		Not rated		Not rated		Not rated	
99002:								
Orthents	Very limited:		Very limited:		Very limited:		Not limited	
	percs slowly (very limited)	1.00	percs slowly (very limited)	1.00	percs slowly (very limited)	1.00		
					slope (moderately limited)	0.50		
99005:								
Orthents	Not rated		Not rated		Not rated		Not rated	
M-W:								
Miscellaneous water	Not rated		Not rated		Not rated		Not rated	
W:								
Water	Not rated		Not rated		Not rated		Not rated	

Table 12a.--Wildlife Habitat

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10A:										
Sturges-------	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00
	percs slowly (limited)	0.76	percs slowly (limited)	0.76						
12A:										
Crestmeade----	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00
	percs slowly (moderately limited)	0.60	percs slowly (moderately limited)	0.60						
14B:										
Grundy--------	Limited: percs slowly (limited)	0.76	Limited: percs slowly (limited)	0.76	Moderately limited: wetness (moderately limited)	0.60	Moderately limited: wetness (moderately limited)	0.60	Moderately limited: wetness (moderately limited)	0.60
	wetness (moderately limited)	0.60	wetness (moderately limited)	0.60						
	highly erodible (moderately limited)	0.50	highly erodible (moderately limited)	0.50						
20F:										
Locksprings---	Very limited: droughty (very limited)	1.00	Limited: highly erodible (limited)	0.80	Limited: droughty (limited)	0.71	Limited: droughty (limited)	0.71	Limited: droughty (limited)	0.71
	highly erodible (limited)	0.80	droughty (limited)	0.71	wetness (moderately limited)	0.60	wetness (moderately limited)	0.60	wetness (moderately limited)	0.60
	wetness (moderately limited)	0.60	wetness (moderately limited)	0.60	too clayey (slightly limited)	0.08	depth to bedrock (moderately limited)	0.42	depth to bedrock (moderately limited)	0.42
21B:										
Weller--------	Moderately limited: wetness (moderately limited)	0.44	Moderately limited: wetness (moderately limited)	0.44	Moderately limited: wetness (moderately limited)	0.44	Moderately limited: wetness (moderately limited)	0.44	Moderately limited: wetness (moderately limited)	0.44

Table 12a.--Wildlife Habitat--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
22C:										
Weller--------	Limited:		Limited:		Moderately limited:		Moderately limited:		Moderately limited:	
	highly erodible (limited)	0.80	highly erodible (limited)	0.80	wetness (moderately limited)	0.44	wetness (moderately limited)	0.44	wetness (moderately limited)	0.44
	percs slowly (limited)	0.76	percs slowly (limited)	0.76						
	wetness (moderately limited)	0.44	wetness (moderately limited)	0.44						
26C2:										
Chillicothe---	Limited:		Limited:		Moderately limited:		Moderately limited:		Moderately limited:	
	highly erodible (limited)	0.80	highly erodible (limited)	0.80	wetness (moderately limited)	0.44	wetness (moderately limited)	0.44	wetness (moderately limited)	0.44
	percs slowly (moderately limited)	0.60	percs slowly (moderately limited)	0.60	too clayey (slightly limited)	0.03	too clayey (slightly limited)	0.03		
	wetness (moderately limited)	0.44	wetness (moderately limited)	0.44						
28C:										
Greenton------	Limited:		Limited:		Limited:		Limited:		Limited:	
	wetness (limited)	0.94	wetness (limited)	0.94	wetness (limited)	0.94	wetness (limited)	0.94	wetness (limited)	0.94
	highly erodible (limited)	0.80	highly erodible (limited)	0.80	too clayey (slightly limited)	0.27	too clayey (slightly limited)	0.27		
	percs slowly (limited)	0.76	percs slowly (limited)	0.76						
28D2:										
Greenton------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00
	highly erodible (limited)	0.80	highly erodible (limited)	0.80	too clayey (slightly limited)	0.25	too clayey (slightly limited)	0.25		
	percs slowly (limited)	0.76	percs slowly (limited)	0.76						
30B:										
Sampsel-------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00
	highly erodible (limited)	0.80	highly erodible (limited)	0.80	too clayey (slightly limited)	0.10	too clayey (slightly limited)	0.10		
	percs slowly (moderately limited)	0.60	percs slowly (moderately limited)	0.60						

Table 12a.--Wildlife Habitat--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
34B2:										
Lagonda	Limited: percs slowly (limited) wetness (moderately limited) highly erodible (moderately limited)	0.76 0.60 0.50	Limited: percs slowly (limited) wetness (moderately limited) highly erodible (moderately limited)	0.76 0.60 0.50	Moderately limited: wetness (moderately limited)	0.60	Moderately limited: wetness (moderately limited)	0.60	Moderately limited: wetness (moderately limited)	0.60
34C2:										
Lagonda	Limited: highly erodible (limited) percs slowly (limited) wetness (moderately limited)	0.80 0.76 0.60	Limited: highly erodible (limited) percs slowly (limited) wetness (moderately limited)	0.80 0.76 0.60	Moderately limited: wetness (moderately limited) too clayey (slightly limited)	0.60 0.01	Moderately limited: wetness (moderately limited) too clayey (slightly limited)	0.60 0.01	Moderately limited: wetness (moderately limited)	0.60
36D2:										
Lamoni	Very limited: percs slowly (very limited) wetness (very limited) highly erodible (limited)	1.00 1.00 0.80	Very limited: percs slowly (very limited) wetness (very limited) highly erodible (limited)	1.00 1.00 0.80	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00	Very limited: wetness (very limited)	1.00
62D2:										
Caleb	Limited: highly erodible (limited)	0.80	Limited: highly erodible (limited)	0.80	Not limited		Not limited		Not limited	
70C2:										
Dawn	Limited: highly erodible (limited) wetness (moderately limited) droughty (slightly limited)	0.80 0.60 0.16	Limited: highly erodible (limited) wetness (moderately limited) depth to bedrock (slightly limited)	0.80 0.60 0.09	Moderately limited: wetness (moderately limited)	0.60	Moderately limited: wetness (moderately limited) depth to bedrock (slightly limited)	0.60 0.09	Moderately limited: wetness (moderately limited) depth to bedrock (slightly limited)	0.60 0.09

Table 12a.--Wildlife Habitat--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
72F:										
Gosport-------	Very limited:		Very limited:		Not limited		Slightly limited:		Slightly limited:	
	percs slowly	1.00	percs slowly	1.00			depth to bedrock	0.03	depth to bedrock	0.03
	(very limited)		(very limited)				(slightly limited)		(slightly limited)	
	highly erodible	0.80	highly erodible	0.80						
	(limited)		(limited)							
	slope	0.48	slope	0.48						
	(moderately limited)		(moderately limited)							
73:										
Sandover------	Very limited:		Limited:		Moderately limited:		Moderately limited:		Moderately limited:	
	droughty	1.00	flooding	0.90	wetness	0.39	wetness	0.39	wetness	0.39
	(very limited)		(limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	flooding	0.90	wetness	0.39	droughty	0.26	droughty	0.26	droughty	0.26
	(limited)		(moderately limited)		(slightly limited)		(slightly limited)		(slightly limited)	
	wetness	0.39	droughty	0.26						
	(moderately limited)		(slightly limited)							
74:										
Dockery-------	Limited:		Limited:		Moderately limited:		Moderately limited:		Moderately limited:	
	flooding	0.90	flooding	0.90	wetness	0.60	wetness	0.60	wetness	0.60
	(limited)		(limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	wetness	0.60	wetness	0.60						
	(moderately limited)		(moderately limited)							
78:										
Colo----------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	0.60	flooding	0.60						
	(moderately limited)		(moderately limited)							
80:										
Tice----------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	0.90	flooding	0.90						
	(limited)		(limited)							

Table 12a.--Wildlife Habitat--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
81:										
Tice----------	Limited:		Limited:		Limited:		Limited:		Limited:	
	wetness	0.73	wetness	0.73	wetness	0.73	wetness	0.73	wetness	0.73
	(limited)		(limited)		(limited)		(limited)		(limited)	
	percs slowly	0.60	percs slowly	0.60	too clayey	0.35	too clayey	0.35		
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)			
	flooding	0.60	flooding	0.60						
	(moderately limited)		(moderately limited)							
82A:										
Triplett------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.76	percs slowly	0.76						
	(limited)		(limited)							
84:										
Vesser--------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	0.60	flooding	0.60						
	(moderately limited)		(moderately limited)							
92:										
Carlow--------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	0.90	flooding	0.90	too clayey	0.38	too clayey	0.38		
	(limited)		(limited)		(moderately limited)		(moderately limited)			
	percs slowly	0.76	percs slowly	0.76						
	(limited)		(limited)							
94:										
Zook----------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	0.90	flooding	0.90	too clayey	0.16	too clayey	0.16		
	(limited)		(limited)		(slightly limited)		(slightly limited)			
	percs slowly	0.60	percs slowly	0.60						
	(moderately limited)		(moderately limited)							

Table 12a.--Wildlife Habitat--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
98:										
Wabash--------	Very limited: wetness (very limited) percs slowly (very limited) flooding (limited)	1.00 1.00 0.90	Very limited: wetness (very limited) percs slowly (very limited) flooding (limited)	1.00 1.00 0.90	Very limited: wetness (very limited) too clayey (limited)	1.00 0.63	Very limited: wetness (very limited) too clayey (limited)	1.00 0.63	Very limited: wetness (very limited)	1.00
99F:										
Putco---------	Limited: droughty (limited) percs slowly (limited) highly erodible (moderately limited)	0.85 0.76 0.50	Limited: percs slowly (limited) highly erodible (moderately limited) too clayey (slightly limited)	0.76 0.50 0.26	Slightly limited: too clayey (slightly limited)	0.26	Slightly limited: too clayey (slightly limited)	0.26	Not limited	
Pits----------	Not rated		Not rated		Not rated		Not rated		Not rated	
Dumps---------	Not rated		Not rated		Not rated		Not rated		Not rated	
99002:										
Orthents------	Very limited: percs slowly (very limited) highly erodible (moderately limited) droughty (slightly limited)	1.00 0.50 0.01	Very limited: percs slowly (very limited) highly erodible (moderately limited)	1.00 0.50	Not limited		Not limited		Not limited	
99005:										
Orthents------	Not rated		Not rated		Not rated		Not rated		Not rated	
M-W:										
Miscellaneous water--------	Not rated		Not rated		Not rated		Not rated		Not rated	
W:										
Water---------	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 12b.--Wildlife Habitat

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Upland mixed deciduous-conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10A:										
Sturges-------	Very limited:		Limited:		Not limited		Not limited		Slightly limited:	
	wetness	1.00	infrequent flooding	0.80					slope	0.02
	(very limited)		(limited)						(slightly limited)	
12A:										
Crestmeade----	Very limited:		Limited:		Not limited		Not limited		Slightly limited:	
	wetness	1.00	infrequent flooding	0.80					seepage	0.18
	(very limited)		(limited)						(slightly limited)	
14B:										
Grundy--------	Moderately limited:		Limited:		Slightly limited:		Slightly limited:		Moderately limited:	
	wetness	0.60	infrequent flooding	0.80	deep to water	0.30	deep to water	0.30	slope	0.40
	(moderately limited)		(limited)		(slightly limited)		(slightly limited)		(moderately limited)	
			deep to water	0.30					deep to water	0.30
			(slightly limited)						(slightly limited)	
20F:										
Locksprings---	Limited:		Limited:		Limited:		Slightly limited:		Very limited:	
	droughty	0.71	infrequent flooding	0.80	droughty	0.71	deep to water	0.30	slope >7%	1.00
	(limited)		(limited)		(limited)		(slightly limited)		(very limited)	
	wetness	0.60	deep to water	0.30	deep to water	0.30			seepage	0.45
	(moderately limited)		(slightly limited)		(slightly limited)				(moderately limited)	
	depth to bedrock	0.42							deep to water	0.30
	(moderately limited)								(slightly limited)	
21B:										
Weller--------	Moderately limited:		Limited:		Moderately limited:		Moderately limited:		Moderately limited:	
	wetness	0.44	infrequent flooding	0.80	deep to water	0.45	deep to water	0.45	seepage	0.45
	(moderately limited)		(limited)		(moderately limited)		(moderately limited)		(moderately limited)	
			deep to water	0.45					deep to water	0.45
			(moderately limited)						(moderately limited)	
									slope	0.40
									(moderately limited)	
22C:										
Weller--------	Moderately limited:		Limited:		Moderately limited:		Moderately limited:		Limited:	
	wetness	0.44	infrequent flooding	0.80	deep to water	0.45	deep to water	0.45	slope	0.79
	(moderately limited)		(limited)		(moderately limited)		(moderately limited)		(limited)	
			deep to water	0.45					deep to water	0.45
			(moderately limited)						(moderately limited)	

Table 12b.--Wildlife Habitat--Continued

Map symbol and soil name	Upland mixed deciduous-conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
26C2:										
Chillicothe---	Moderately limited:		Limited:		Moderately limited:		Moderately limited:		Limited:	
	wetness	0.44	infrequent flooding	0.80	deep to water	0.45	deep to water	0.45	slope	0.98
	(moderately limited)		(limited)		(moderately limited)		(moderately limited)		(limited)	
			deep to water	0.45					deep to water	0.45
			(moderately limited)						(moderately limited)	
									seepage	0.07
									(slightly limited)	
28C:										
Greenton------	Limited:		Limited:		Slightly limited:		Slightly limited:		Limited:	
	wetness	0.94	infrequent flooding	0.80	deep to water	0.06	deep to water	0.06	slope	0.98
	(limited)		(limited)		(slightly limited)		(slightly limited)		(limited)	
			deep to water	0.06					deep to water	0.06
			(slightly limited)						(slightly limited)	
28D2:										
Greenton------	Very limited:		Limited:		Not limited		Not limited		Very limited:	
	wetness	1.00	infrequent flooding	0.80					slope >7%	1.00
	(very limited)		(limited)						(very limited)	
30B:										
Sampsel-------	Very limited:		Limited:		Not limited		Not limited		Moderately limited:	
	wetness	1.00	infrequent flooding	0.80					slope	0.40
	(very limited)		(limited)						(moderately limited)	
									seepage	0.18
									(slightly limited)	
34B2:										
Lagonda-------	Moderately limited:		Limited:		Slightly limited:		Slightly limited:		Moderately limited:	
	wetness	0.60	infrequent flooding	0.80	deep to water	0.30	deep to water	0.30	slope	0.40
	(moderately limited)		(limited)		(slightly limited)		(slightly limited)		(moderately limited)	
			deep to water	0.30					deep to water	0.30
			(slightly limited)						(slightly limited)	
34C2:										
Lagonda-------	Moderately limited:		Limited:		Slightly limited:		Slightly limited:		Limited:	
	wetness	0.60	infrequent flooding	0.80	deep to water	0.30	deep to water	0.30	slope	0.98
	(moderately limited)		(limited)		(slightly limited)		(slightly limited)		(limited)	
			deep to water	0.30					deep to water	0.30
			(slightly limited)						(slightly limited)	
36D2:										
Lamoni--------	Very limited:		Limited:		Not limited		Not limited		Very limited:	
	wetness	1.00	infrequent flooding	0.80					slope >7%	1.00
	(very limited)		(limited)						(very limited)	

Table 12b.--Wildlife Habitat--Continued

Map symbol and soil name	Upland mixed deciduous-conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
62D2:										
Caleb	Not limited		Limited: infrequent flooding (limited)	0.80	Not limited		Not limited		Very limited: slope >7% (very limited)	1.00
									seepage (moderately limited)	0.45
70C2:										
Dawn	Moderately limited: wetness (moderately limited)	0.60	Limited: infrequent flooding (limited)	0.80	Slightly limited: deep to water (slightly limited)	0.30	Slightly limited: deep to water (slightly limited)	0.30	Very limited: slope >7% (very limited)	1.00
	depth to bedrock (slightly limited)	0.09	deep to water (slightly limited)	0.30					seepage (moderately limited)	0.45
									deep to water (slightly limited)	0.30
72F:										
Gosport	Slightly limited: depth to bedrock (slightly limited)	0.03	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: slope >7% (very limited)	1.00
									deep to water (very limited)	1.00
73:										
Sandover	Moderately limited: wetness (moderately limited)	0.39	Limited: infrequent flooding (limited)	0.80	Moderately limited: deep to water (moderately limited)	0.50	Moderately limited: deep to water (moderately limited)	0.50	Very limited: seepage (very limited)	1.00
	droughty (slightly limited)	0.26	deep to water (moderately limited)	0.50	droughty (slightly limited)	0.26			deep to water (moderately limited)	0.50
74:										
Dockery	Moderately limited: wetness (moderately limited)	0.60	Limited: infrequent flooding (limited)	0.80	Slightly limited: deep to water (slightly limited)	0.30	Slightly limited: deep to water (slightly limited)	0.30	Moderately limited: seepage (moderately limited)	0.45
			deep to water (slightly limited)	0.30					deep to water (slightly limited)	0.30
78:										
Colo	Very limited: wetness (very limited)	1.00	Limited: infrequent flooding (limited)	0.80	Not limited		Not limited		Moderately limited: seepage (moderately limited)	0.45
80:										
Tice	Very limited: wetness (very limited)	1.00	Limited: infrequent flooding (limited)	0.80	Not limited		Not limited		Moderately limited: seepage (moderately limited)	0.45

Table 12b.--Wildlife Habitat--Continued

Map symbol and soil name	Upland mixed deciduous-conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
81:										
Tice----------	Limited: wetness (limited)	0.73	Limited: infrequent flooding (limited) deep to water (slightly limited)	0.80 0.21	Slightly limited: deep to water (slightly limited)	0.21	Slightly limited: deep to water (slightly limited)	0.21	Slightly limited: deep to water (slightly limited) seepage (slightly limited)	0.21 0.15
82A:										
Triplett------	Very limited: wetness (very limited)	1.00	Limited: infrequent flooding (limited)	0.80	Not limited		Not limited		Slightly limited: slope (slightly limited)	0.02
84:										
Vesser--------	Very limited: wetness (very limited)	1.00	Limited: infrequent flooding (limited)	0.80	Not limited		Not limited		Moderately limited: seepage (moderately limited)	0.45
92:										
Carlow--------	Very limited: wetness (very limited)	1.00	Limited: infrequent flooding (limited)	0.80	Not limited		Not limited		Not limited	
94:										
Zook----------	Very limited: wetness (very limited)	1.00	Limited: infrequent flooding (limited)	0.80	Not limited		Not limited		Slightly limited: seepage (slightly limited)	0.18
98:										
Wabash--------	Very limited: wetness (very limited)	1.00	Limited: infrequent flooding (limited)	0.80	Not limited		Not limited		Not limited	
99F:										
Putco---------	Not limited		Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: slope >7% (very limited) deep to water (very limited)	1.00 1.00
Pits----------	Not rated		Not rated		Not rated		Not rated		Not rated	
Dumps---------	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 12b.--Wildlife Habitat--Continued

Map symbol and soil name	Upland mixed deciduous-conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
99002:										
Orthents	Not limited		Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited)	1.00	Very limited: deep to water (very limited) soil reaction (very limited)	1.00 1.00	Very limited: deep to water (very limited) soil reaction (very limited) slope (moderately limited)	1.00 1.00 0.40
99005:										
Orthents	Not rated		Not rated		Not rated		Not rated		Not rated	
M-W:										
Miscellaneous water	Not rated		Not rated		Not rated		Not rated		Not rated	
W:										
Water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 13.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10A:										
Sturges	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	shrink-swell (very limited)	1.00	shrink-swell (very limited)	1.00	shrink-swell (very limited)	1.00	shrink-swell (very limited)	1.00	wetness (very limited)	1.00
	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	low strength (very limited)	1.00		
							wetness (very limited)	1.00		
12A:										
Crestmeade	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	low strength (very limited)	1.00	wetness (very limited)	1.00
	shrink-swell (very limited)	1.00	shrink-swell (limited)	0.92	shrink-swell (very limited)	1.00	wetness (very limited)	1.00		
							shrink-swell (very limited)	1.00		
14B:										
Grundy	Very limited:		Very limited:		Very limited:		Very limited:		Limited:	
	shrink-swell (very limited)	1.00	wetness (very limited)	1.00	shrink-swell (very limited)	1.00	low strength (very limited)	1.00	wetness (limited)	0.60
	wetness (limited)	0.60	shrink-swell (very limited)	1.00	wetness (limited)	0.60	shrink-swell (very limited)	1.00		
					slope (slightly limited)	0.03	wetness (limited)	0.60		
20F:										
Locksprings	Very limited:		Very limited:		Very limited:		Very limited:		Limited:	
	shrink-swell (very limited)	1.00	wetness (very limited)	1.00	slope >8% (very limited)	1.00	low strength (very limited)	1.00	droughty (limited)	0.71
	slope (limited)	0.67	hard bedrock <40" (very limited)	1.00	shrink-swell (very limited)	1.00	shrink-swell (very limited)	1.00	wetness (limited)	0.60
	wetness (limited)	0.60	shrink-swell (very limited)	1.00	wetness (limited)	0.60	wetness (limited)	0.60	too clayey (moderately limited)	0.60

Table 13.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
21B:										
Weller--------	Very limited:		Very limited:		Very limited:		Very limited:		Slightly limited:	
	shrink-swell	1.00	wetness	1.00	shrink-swell	1.00	low strength	1.00	wetness	0.28
	(very limited)		(very limited)		(very limited)		(very limited)		(slightly limited)	
	wetness	0.28	shrink-swell	1.00	wetness	0.28	shrink-swell	1.00		
	(slightly limited)		(very limited)		(slightly limited)		(very limited)			
					slope	0.03	wetness	0.28		
					(slightly limited)		(slightly limited)			
22C:										
Weller--------	Very limited:		Very limited:		Very limited:		Very limited:		Slightly limited:	
	shrink-swell	1.00	wetness	1.00	shrink-swell	1.00	low strength	1.00	wetness	0.28
	(very limited)		(very limited)		(very limited)		(very limited)		(slightly limited)	
	wetness	0.28	shrink-swell	1.00	slope	0.62	shrink-swell	1.00		
	(slightly limited)		(very limited)		(limited)		(very limited)			
					wetness	0.28	wetness	0.28		
					(slightly limited)		(slightly limited)			
26C2:										
Chillicothe---	Very limited:		Very limited:		Very limited:		Very limited:		Moderately limited:	
	shrink-swell	1.00	wetness	1.00	shrink-swell	1.00	low strength	1.00	too clayey	0.60
	(very limited)		(very limited)		(very limited)		(very limited)		(moderately limited)	
	wetness	0.28	shrink-swell	1.00	slope	0.80	shrink-swell	1.00	wetness	0.28
	(slightly limited)		(very limited)		(limited)		(very limited)		(slightly limited)	
	slope	0.14	slope	0.14	wetness	0.28	wetness	0.28		
	(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)			
28C:										
Greenton------	Very limited:		Very limited:		Very limited:		Very limited:		Limited:	
	shrink-swell	1.00	wetness	1.00	shrink-swell	1.00	low strength	1.00	wetness	0.94
	(very limited)		(very limited)		(very limited)		(very limited)		(limited)	
	wetness	0.94	shrink-swell	1.00	wetness	0.94	shrink-swell	1.00	too clayey	0.60
	(limited)		(very limited)		(limited)		(very limited)		(moderately limited)	
	slope	0.14	slope	0.14	slope	0.80	wetness	0.94		
	(slightly limited)		(slightly limited)		(limited)		(limited)			
28D2:										
Greenton------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	slope >8%	1.00	low strength	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	shrink-swell	1.00	shrink-swell	1.00	shrink-swell	1.00	wetness	1.00	too clayey	0.60
	(very limited)		(very limited)		(very limited)		(very limited)		(moderately limited)	
	slope	0.59	slope	0.59	wetness	1.00	shrink-swell	1.00	slope	0.16
	(moderately limited)		(moderately limited)		(very limited)		(very limited)		(slightly limited)	

Table 13.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
30B:										
Sampsel	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	low strength	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	shrink-swell	1.00	shrink-swell	1.00	shrink-swell	1.00	wetness	1.00	too clayey	0.60
	(very limited)		(very limited)		(very limited)		(very limited)		(moderately limited)	
					slope	0.03	shrink-swell	1.00		
					(slightly limited)		(very limited)			
34B2:										
Lagonda	Very limited:		Very limited:		Very limited:		Very limited:		Limited:	
	shrink-swell	1.00	wetness	1.00	shrink-swell	1.00	low strength	1.00	wetness	0.60
	(very limited)		(very limited)		(very limited)		(very limited)		(limited)	
	wetness	0.60	shrink-swell	1.00	wetness	0.60	shrink-swell	1.00		
	(limited)		(very limited)		(limited)		(very limited)			
					slope	0.03	wetness	0.60		
					(slightly limited)		(limited)			
34C2:										
Lagonda	Very limited:		Very limited:		Very limited:		Very limited:		Limited:	
	shrink-swell	1.00	wetness	1.00	shrink-swell	1.00	low strength	1.00	wetness	0.60
	(very limited)		(very limited)		(very limited)		(very limited)		(limited)	
	wetness	0.60	shrink-swell	1.00	slope	0.80	shrink-swell	1.00	too clayey	0.30
	(limited)		(very limited)		(limited)		(very limited)		(moderately limited)	
	slope	0.14	slope	0.14	wetness	0.60	wetness	0.60		
	(slightly limited)		(slightly limited)		(limited)		(limited)			
36D2:										
Lamoni	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	slope >8%	1.00	low strength	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	shrink-swell	1.00	shrink-swell	1.00	shrink-swell	1.00	wetness	1.00	slope	0.04
	(very limited)		(very limited)		(very limited)		(very limited)		(slightly limited)	
	slope	0.44	slope	0.44	wetness	1.00	shrink-swell	1.00		
	(moderately limited)		(moderately limited)		(very limited)		(very limited)			
62D2:										
Caleb	Moderately limited:		Limited:		Very limited:		Very limited:		Slightly limited:	
	slope	0.59	wetness	0.95	slope >8%	1.00	low strength	1.00	slope	0.16
	(moderately limited)		(limited)		(very limited)		(very limited)		(slightly limited)	
	shrink-swell	0.45	slope	0.59	shrink-swell	0.45	shrink-swell	0.45		
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)			
			shrink-swell	0.18			slope	0.16		
			(slightly limited)				(slightly limited)			

Table 13.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70C2:										
Dawn----------	Limited:		Very limited:		Limited:		Limited:		Limited:	
	wetness	0.60	wetness	1.00	slope	0.99	wetness	0.60	wetness	0.60
	(limited)		(very limited)		(limited)		(limited)		(limited)	
	slope	0.29	slope	0.29	wetness	0.60			depth to bedrock	0.09
	(slightly limited)		(slightly limited)		(limited)				(slightly limited)	
			soft bedrock	0.03						
			(slightly limited)							
72F:										
Gosport-------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	shrink-swell	1.00	shrink-swell	1.00	slope >8%	1.00	low strength	1.00	slope >15%	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	slope >15%	1.00	slope >15%	1.00	shrink-swell	1.00	slope >15%	1.00	depth to bedrock	0.03
	(very limited)		(very limited)		(very limited)		(very limited)		(slightly limited)	
			soft bedrock	0.01			shrink-swell	1.00		
			(slightly limited)				(very limited)			
73:										
Sandover------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	flooding	1.00	flooding	1.00	flooding	1.00	flooding	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	0.19	wetness	1.00	wetness	0.19	wetness	0.19	droughty	0.26
	(slightly limited)		(very limited)		(slightly limited)		(slightly limited)		(slightly limited)	
									wetness	0.19
									(slightly limited)	
74:										
Dockery-------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	flooding	1.00	flooding	1.00	flooding	1.00	flooding	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	0.60	wetness	1.00	wetness	0.60	low strength	1.00	wetness	0.60
	(limited)		(very limited)		(limited)		(very limited)		(limited)	
	shrink-swell	0.45	shrink-swell	0.45	shrink-swell	0.45	wetness	0.60		
	(moderately limited)		(moderately limited)		(moderately limited)		(limited)			
78:										
Colo----------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	flooding	1.00	flooding	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	1.00	wetness	1.00	wetness	1.00	flooding	1.00	flooding	0.60
	(very limited)		(very limited)		(very limited)		(very limited)		(moderately limited)	
	shrink-swell	0.45	shrink-swell	0.45	shrink-swell	0.45	low strength	1.00		
	(moderately limited)		(moderately limited)		(moderately limited)		(very limited)			

Table 13.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
80:										
Tice----------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	flooding	1.00	flooding	1.00	flooding	1.00	flooding	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	shrink-swell	0.45	shrink-swell	0.45	shrink-swell	0.45	shrink-swell	0.45		
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)			
81:										
Tice----------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	flooding	1.00	flooding	1.00	flooding	1.00	too clayey	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	0.73	wetness	1.00	wetness	0.73	wetness	0.73	wetness	0.73
	(limited)		(very limited)		(limited)		(limited)		(limited)	
	shrink-swell	0.45	shrink-swell	0.45	shrink-swell	0.45	shrink-swell	0.45	flooding	0.60
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
82A:										
Triplett------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	flooding	1.00	flooding	1.00	low strength	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00		
	(very limited)		(very limited)		(very limited)		(very limited)			
	shrink-swell	1.00	shrink-swell	1.00	shrink-swell	1.00	shrink-swell	1.00		
	(very limited)		(very limited)		(very limited)		(very limited)			
84:										
Vesser--------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	flooding	1.00	flooding	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	1.00	wetness	1.00	wetness	1.00	flooding	1.00	flooding	0.60
	(very limited)		(very limited)		(very limited)		(very limited)		(moderately limited)	
	shrink-swell	0.45	shrink-swell	0.45	shrink-swell	0.45	low strength	1.00		
	(moderately limited)		(moderately limited)		(moderately limited)		(very limited)			
92:										
Carlow--------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	flooding	1.00	flooding	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	1.00	wetness	1.00	wetness	1.00	flooding	1.00	flooding	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	shrink-swell	1.00	shrink-swell	1.00	shrink-swell	1.00	low strength	1.00	too clayey	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	

Table 13.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
94:										
Zook----------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	flooding	1.00	flooding	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	1.00	wetness	1.00	wetness	1.00	flooding	1.00	flooding	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	shrink-swell	1.00	shrink-swell	1.00	shrink-swell	1.00	low strength	1.00	too clayey	0.60
	(very limited)		(very limited)		(very limited)		(very limited)		(moderately limited)	
98:										
Wabash--------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	shrink-swell	1.00	flooding	1.00	wetness	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	shrink-swell	1.00	flooding	1.00	shrink-swell	1.00	shrink-swell	1.00	flooding	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	1.00	wetness	1.00	wetness	1.00	flooding	1.00	too clayey	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
99F:										
Putco---------	Very limited:		Very limited:		Very limited:		Very limited:		Moderately limited:	
	shrink-swell	1.00	shrink-swell	1.00	slope >8%	1.00	shrink-swell	1.00	too clayey	0.60
	(very limited)		(very limited)		(very limited)		(very limited)		(moderately limited)	
	slope	0.67	slope	0.67	shrink-swell	1.00	low strength	1.00	slope	0.37
	(limited)		(limited)		(very limited)		(very limited)		(moderately limited)	
							slope	0.37		
							(moderately limited)			
Pits----------	Not rated		Not rated		Not rated		Not rated		Not rated	
Dumps---------	Not rated		Not rated		Not rated		Not rated		Not rated	
99002:										
Orthents------	Moderately limited:		Moderately limited:		Moderately limited:		Moderately limited:		Not limited	
	shrink-swell	0.45	shrink-swell	0.45	shrink-swell	0.45	shrink-swell	0.45		
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)			
					slope	0.03				
					(slightly limited)					
99005:										
Orthents------	Not rated		Not rated		Not rated		Not rated		Not rated	
M-W:										
Miscellaneous water--------	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 13.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
W:										
Water---------	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 14.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10A:										
Sturges--------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	hard to pack	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.85	slope	0.02	too clayey	0.40			wetness	1.00
	(limited)		(slightly limited)		(moderately limited)				(very limited)	
									too clayey	0.67
									(limited)	
12A:										
Crestmeade----	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	hard to pack	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.85			too clayey	0.05			wetness	1.00
	(limited)				(slightly limited)				(very limited)	
									too clayey	0.37
									(moderately limited)	
14B:										
Grundy--------	Very limited:		Very limited:		Very limited:		Limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	0.99	hard to pack	1.00
	(very limited)		(very limited)		(very limited)		(limited)		(very limited)	
	percs slowly	0.85	slope	0.40	too clayey	0.07			wetness	0.60
	(limited)		(moderately limited)		(slightly limited)				(moderately limited)	
									too clayey	0.41
									(moderately limited)	
20F:										
Locksprings---	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	slope >7%	1.00	wetness	1.00	depth to bedrock	1.00	hard to pack	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	depth to bedrock	1.00	wetness	1.00	depth to bedrock	1.00	wetness	0.99	depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(limited)		(very limited)	
	percs slowly	0.85	large stones	1.00	too clayey	0.56	slope	0.37	large stones	0.75
	(limited)		(very limited)		(moderately limited)		(moderately limited)		(limited)	

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
21B:										
Weller--------	Very limited:		Very limited:		Limited:		Limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	0.99	wetness	0.80	hard to pack	1.00
	(very limited)		(very limited)		(limited)		(limited)		(very limited)	
	percs slowly	0.85	slope	0.40	too clayey	0.02			wetness	0.50
	(limited)		(moderately limited)		(slightly limited)				(moderately limited)	
									too clayey	0.30
									(moderately limited)	
22C:										
Weller--------	Very limited:		Very limited:		Limited:		Limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	0.99	wetness	0.80	hard to pack	1.00
	(very limited)		(very limited)		(limited)		(limited)		(very limited)	
	percs slowly	0.85	slope	0.79	too clayey	0.02			wetness	0.50
	(limited)		(limited)		(slightly limited)				(moderately limited)	
									too clayey	0.30
									(moderately limited)	
26C2:										
Chillicothe---	Very limited:		Very limited:		Very limited:		Limited:		Very limited:	
	wetness	1.00	wetness	1.00	depth to bedrock	1.00	wetness	0.80	hard to pack	1.00
	(very limited)		(very limited)		(very limited)		(limited)		(very limited)	
	percs slowly	0.60	slope	0.98	wetness	0.99			wetness	0.50
	(moderately limited)		(limited)		(limited)				(moderately limited)	
	depth to bedrock	0.05	potential seepage	0.50	too clayey	0.06			too clayey	0.38
	(slightly limited)		(moderately limited)		(slightly limited)				(moderately limited)	
28C:										
Greenton------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	hard to pack	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.85	slope	0.98	too clayey	0.22			wetness	0.94
	(limited)		(limited)		(slightly limited)				(limited)	
									too clayey	0.60
									(moderately limited)	
28D2:										
Greenton------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	slope >7%	1.00	depth to bedrock	1.00	wetness	1.00	hard to pack	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.85	wetness	1.00	wetness	1.00	depth to bedrock	0.45	wetness	1.00
	(limited)		(very limited)		(very limited)		(moderately limited)		(very limited)	
	depth to bedrock	0.60	depth to bedrock	0.60	too clayey	0.19	slope	0.16	too clayey	0.57
	(limited)		(limited)		(slightly limited)		(slightly limited)		(moderately limited)	

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
30B:										
Sampsel	Very limited: wetness (very limited) percs slowly (limited)	1.00 0.85	Very limited: wetness (very limited) slope (moderately limited)	1.00 0.40	Very limited: wetness (very limited) too clayey (slightly limited)	1.00 0.01	Very limited: wetness (very limited)	1.00	Very limited: hard to pack (very limited) wetness (very limited) too clayey (slightly limited)	1.00 1.00 0.23
34B2:										
Lagonda	Very limited: wetness (very limited) percs slowly (limited)	1.00 0.85	Very limited: wetness (very limited) slope (moderately limited)	1.00 0.40	Very limited: wetness (very limited) too clayey (slightly limited)	1.00 0.17	Limited: wetness (limited)	0.99	Very limited: hard to pack (very limited) wetness (moderately limited) too clayey (moderately limited)	1.00 0.60 0.54
34C2:										
Lagonda	Very limited: wetness (very limited) percs slowly (limited)	1.00 0.85	Very limited: wetness (very limited) slope (limited)	1.00 0.98	Very limited: wetness (very limited) too clayey (slightly limited)	1.00 0.01	Limited: wetness (limited)	0.99	Very limited: hard to pack (very limited) wetness (moderately limited) too clayey (slightly limited)	1.00 0.60 0.18
36D2:										
Lamoni	Very limited: wetness (very limited) percs slowly (very limited) slope (slightly limited)	1.00 1.00 0.04	Very limited: slope >7% (very limited) wetness (very limited)	1.00 1.00	Very limited: wetness (very limited) too clayey (slightly limited) slope (slightly limited)	1.00 0.11 0.04	Very limited: wetness (very limited) slope (slightly limited)	1.00 0.04	Very limited: hard to pack (very limited) wetness (very limited) too clayey (moderately limited)	1.00 1.00 0.47
62D2:										
Caleb	Limited: wetness (limited) slope (slightly limited) percs slowly (slightly limited)	0.99 0.16 0.15	Very limited: slope >7% (very limited) wetness (very limited) probable seepage (very limited)	1.00 1.00 1.00	Limited: wetness (limited) seepage (limited) slope (slightly limited)	0.80 0.64 0.16	Slightly limited: wetness (slightly limited) slope (slightly limited)	0.30 0.16	Moderately limited: wetness (moderately limited) slope (slightly limited)	0.30 0.16

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70C2:										
Dawn	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	probable seepage	1.00	wetness	1.00	depth to bedrock	1.00	probable seepage	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	depth to bedrock	1.00	slope >7%	1.00	seepage	1.00	seepage	1.00	depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	poor filter	1.00	depth to bedrock	1.00	depth to bedrock	1.00	wetness	0.99	wetness	0.60
	(very limited)		(very limited)		(very limited)		(limited)		(moderately limited)	
72F:										
Gosport	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	percs slowly	1.00	slope >7%	1.00	slope >15%	1.00	slope >15%	1.00	hard to pack	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	slope >15%	1.00	depth to bedrock	1.00	depth to bedrock	1.00	depth to bedrock	1.00	slope >15%	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	depth to bedrock	1.00			too clayey	0.04			depth to bedrock	1.00
	(very limited)				(slightly limited)				(very limited)	
73:										
Sandover	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	flooding	1.00	flooding	1.00	flooding	1.00	probable seepage	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00	probable seepage	1.00	too sandy	1.00	seepage	1.00	too sandy	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	poor filter	1.00			wetness	0.96	wetness	0.73	wetness	0.47
	(very limited)				(limited)		(limited)		(moderately limited)	
74:										
Dockery	Very limited:		Very limited:		Very limited:		Very limited:		Moderately limited:	
	wetness	1.00	flooding	1.00	flooding	1.00	flooding	1.00	wetness	0.60
	(very limited)		(very limited)		(very limited)		(very limited)		(moderately limited)	
	flooding	1.00	wetness	1.00	wetness	1.00	wetness	0.99		
	(very limited)		(very limited)		(very limited)		(limited)			
	percs slowly	0.15	potential seepage	0.50						
	(slightly limited)		(moderately limited)							
78:										
Colo	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	flooding	1.00	wetness	1.00	flooding	1.00	wetness	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	1.00	wetness	1.00	flooding	1.00	wetness	1.00		
	(very limited)		(very limited)		(very limited)		(very limited)			
	percs slowly	0.15	potential seepage	0.50						
	(slightly limited)		(moderately limited)							

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
80:										
Tice	Very limited: wetness (very limited) flooding (very limited) percs slowly (slightly limited)	1.00 1.00 0.15	Very limited: flooding (very limited) wetness (very limited) potential seepage (moderately limited)	1.00 1.00 0.50	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: wetness (very limited)	1.00
81:										
Tice	Very limited: wetness (very limited) flooding (very limited) percs slowly (slightly limited)	1.00 1.00 0.15	Very limited: flooding (very limited) wetness (very limited) potential seepage (moderately limited)	1.00 1.00 0.50	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Limited: wetness (limited)	0.73
82A:										
Triplett	Very limited: wetness (very limited) percs slowly (limited) flooding (rare) (moderately limited)	1.00 0.85 0.60	Very limited: wetness (very limited) slope (slightly limited)	1.00 0.02	Very limited: wetness (very limited) flooding (rare) (moderately limited) too clayey (slightly limited)	1.00 0.60 0.14	Very limited: wetness (very limited) flooding (rare) (moderately limited)	1.00 0.60	Very limited: hard to pack (very limited) wetness (very limited) too clayey (moderately limited)	1.00 1.00 0.51
84:										
Vesser	Very limited: wetness (very limited) flooding (very limited) percs slowly (slightly limited)	1.00 1.00 0.15	Very limited: flooding (very limited) wetness (very limited) potential seepage (moderately limited)	1.00 1.00 0.50	Very limited: wetness (very limited) flooding (very limited) too clayey (slightly limited)	1.00 1.00 0.01	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: wetness (very limited) too clayey (slightly limited)	1.00 0.02
92:										
Carlow	Very limited: wetness (very limited) flooding (very limited) percs slowly (very limited)	1.00 1.00 1.00	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: wetness (very limited) flooding (very limited) too clayey (moderately limited)	1.00 1.00 0.37	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: hard to pack (very limited) wetness (very limited) too clayey (limited)	1.00 1.00 0.66

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
94:										
Zook	Very limited: wetness (very limited) flooding (very limited) percs slowly (limited)	1.00 1.00 0.85	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: wetness (very limited) flooding (very limited) too clayey (slightly limited)	1.00 1.00 0.13	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: hard to pack (very limited) wetness (very limited) too clayey (moderately limited)	1.00 1.00 0.49
98:										
Wabash	Very limited: wetness (very limited) flooding (very limited) percs slowly (very limited)	1.00 1.00 1.00	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: wetness (very limited) flooding (very limited) too clayey (moderately limited)	1.00 1.00 0.32	Very limited: flooding (very limited) wetness (very limited)	1.00 1.00	Very limited: hard to pack (very limited) wetness (very limited) too clayey (limited)	1.00 1.00 0.64
99F:										
Putco	Limited: percs slowly (limited) slope (moderately limited)	0.85 0.37	Very limited: slope >7% (very limited)	1.00	Moderately limited: slope (moderately limited) too clayey (slightly limited)	0.37 0.22	Moderately limited: slope (moderately limited)	0.37	Very limited: hard to pack (very limited) too clayey (moderately limited) small stones (moderately limited)	1.00 0.60 0.49
Pits	Not rated		Not rated		Not rated		Not rated		Not rated	
Dumps	Not rated		Not rated		Not rated		Not rated		Not rated	
99002:										
Orthents	Slightly limited: percs slowly (slightly limited)	0.21	Moderately limited: slope (moderately limited) potential seepage (slightly limited)	0.40 0.30	Not limited		Not limited		Not limited	
99005:										
Orthents	Not rated		Not rated		Not rated		Not rated		Not rated	
M-W:										
Miscellaneous water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
W:										
Water---------	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 15.--Construction Materials and Excavating

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Roadfill		Topsoil		Source for sand		Source for gravel		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10A:										
Sturges	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	shrink-swell (very limited)	1.00	too clayey (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (thickest layer)	1.00	wetness (very limited)	1.00
	low strength (very limited)	1.00	wetness (very limited)	1.00	excess fines (bottom layer)	1.00	excess fines (bottom layer)	1.00	too clayey (limited)	0.67
	wetness (very limited)	1.00	too acid (moderately limited)	0.36					cutbanks cave (slightly limited)	0.29
12A:										
Crestmeade	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength (very limited)	1.00	too clayey (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (thickest layer)	1.00	wetness (very limited)	1.00
	wetness (very limited)	1.00	wetness (very limited)	1.00	excess fines (bottom layer)	1.00	excess fines (bottom layer)	1.00	too clayey (moderately limited)	0.37
	shrink-swell (limited)	0.92	too acid (moderately limited)	0.54					cutbanks cave (slightly limited)	0.29
14B:										
Grundy	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength (very limited)	1.00	too clayey (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (thickest layer)	1.00	wetness (very limited)	1.00
	shrink-swell (very limited)	1.00	wetness (limited)	0.86	excess fines (bottom layer)	1.00	excess fines (bottom layer)	1.00	too clayey (moderately limited)	0.41
	wetness (limited)	0.86	too acid (slightly limited)	0.14					cutbanks cave (slightly limited)	0.29
20F:										
Locksprings	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength (very limited)	1.00	too clayey (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (thickest layer)	1.00	wetness (very limited)	1.00
	shrink-swell (very limited)	1.00	depth to bedrock (very limited)	1.00	large stones (thickest layer)	1.00	large stones (thickest layer)	1.00	hard bedrock <40" (very limited)	1.00
	depth to bedrock (very limited)	1.00	wetness (limited)	0.86	excess fines (bottom layer)	1.00	excess fines (bottom layer)	1.00	too clayey (limited)	0.72

Table 15.--Construction Materials and Excavating--Continued

Map symbol and soil name	Roadfill		Topsoil		Source for sand		Source for gravel		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
21B:										
Weller--------	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength	1.00	too clayey	1.00	excess fines	1.00	excess fines	1.00	wetness	1.00
	(very limited)		(very limited)		(thickest layer)		(thickest layer)		(very limited)	
	shrink-swell	1.00	wetness	0.48	excess fines	1.00	excess fines	1.00	too clayey	0.30
	(very limited)		(moderately limited)		(bottom layer)		(bottom layer)		(moderately limited)	
	wetness	0.48	too acid	0.42					cutbanks cave	0.29
	(moderately limited)		(moderately limited)						(slightly limited)	
22C:										
Weller--------	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength	1.00	too clayey	1.00	excess fines	1.00	excess fines	1.00	wetness	1.00
	(very limited)		(very limited)		(thickest layer)		(thickest layer)		(very limited)	
	shrink-swell	1.00	wetness	0.48	excess fines	1.00	excess fines	1.00	too clayey	0.30
	(very limited)		(moderately limited)		(bottom layer)		(bottom layer)		(moderately limited)	
	wetness	0.48	too acid	0.42					cutbanks cave	0.29
	(moderately limited)		(moderately limited)						(slightly limited)	
26C2:										
Chillicothe---	Very limited:		Limited:		Improbable:		Improbable:		Very limited:	
	low strength	1.00	too clayey	0.97	excess fines	1.00	excess fines	1.00	wetness	1.00
	(very limited)		(limited)		(thickest layer)		(thickest layer)		(very limited)	
	shrink-swell	1.00	too acid	0.54	excess fines	1.00	excess fines	1.00	too clayey	0.38
	(very limited)		(moderately limited)		(bottom layer)		(bottom layer)		(moderately limited)	
	wetness	0.48	wetness	0.48					cutbanks cave	0.29
	(moderately limited)		(moderately limited)						(slightly limited)	
28C:										
Greenton------	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength	1.00	too clayey	1.00	excess fines	1.00	excess fines	1.00	wetness	1.00
	(very limited)		(very limited)		(thickest layer)		(thickest layer)		(very limited)	
	shrink-swell	1.00	wetness	0.99	excess fines	1.00	excess fines	1.00	too clayey	0.60
	(very limited)		(very limited)		(bottom layer)		(bottom layer)		(moderately limited)	
	wetness	0.99							cutbanks cave	0.29
	(very limited)								(slightly limited)	
28D2:										
Greenton------	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength	1.00	too clayey	1.00	excess fines	1.00	excess fines	1.00	wetness	1.00
	(very limited)		(very limited)		(thickest layer)		(thickest layer)		(very limited)	
	shrink-swell	1.00	wetness	1.00	excess fines	1.00	excess fines	1.00	too clayey	0.57
	(very limited)		(very limited)		(bottom layer)		(bottom layer)		(moderately limited)	
	wetness	1.00	slope	0.16					cutbanks cave	0.29
	(very limited)		(slightly limited)						(slightly limited)	

Table 15.--Construction Materials and Excavating--Continued

Map symbol and soil name	Roadfill		Topsoil		Source for sand		Source for gravel		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
30B:										
Sampsel	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength (very limited)	1.00	wetness (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (thickest layer)	1.00	wetness (very limited)	1.00
	wetness (very limited)	1.00	too clayey (limited)	0.99	excess fines (bottom layer)	1.00	excess fines (bottom layer)	1.00	cutbanks cave (slightly limited)	0.29
	shrink-swell (very limited)	1.00							too clayey (slightly limited)	0.23
34B2:										
Lagonda	Very limited:		Limited:		Improbable:		Improbable:		Very limited:	
	low strength (very limited)	1.00	wetness (limited)	0.86	excess fines (thickest layer)	1.00	excess fines (thickest layer)	1.00	wetness (very limited)	1.00
	shrink-swell (very limited)	1.00	too clayey (limited)	0.86	excess fines (bottom layer)	1.00	excess fines (bottom layer)	1.00	too clayey (moderately limited)	0.54
	wetness (limited)	0.86							cutbanks cave (slightly limited)	0.29
34C2:										
Lagonda	Very limited:		Limited:		Improbable:		Improbable:		Very limited:	
	low strength (very limited)	1.00	too clayey (limited)	0.96	excess fines (thickest layer)	1.00	excess fines (thickest layer)	1.00	wetness (very limited)	1.00
	shrink-swell (very limited)	1.00	wetness (limited)	0.86	excess fines (bottom layer)	1.00	excess fines (bottom layer)	1.00	cutbanks cave (slightly limited)	0.29
	wetness (limited)	0.86							too clayey (slightly limited)	0.18
36D2:										
Lamoni	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength (very limited)	1.00	too clayey (very limited)	1.00	excess fines (thickest layer)	1.00	excess fines (thickest layer)	1.00	wetness (very limited)	1.00
	shrink-swell (very limited)	1.00	wetness (very limited)	1.00	excess fines (bottom layer)	1.00	excess fines (bottom layer)	1.00	too clayey (moderately limited)	0.47
	wetness (very limited)	1.00	too acid (moderately limited)	0.48					cutbanks cave (slightly limited)	0.29
62D2:										
Caleb	Very limited:		Moderately limited:		Improbable:		Improbable:		Limited:	
	low strength (very limited)	1.00	too clayey (moderately limited)	0.50	excess fines (thickest layer)	1.00	excess fines (thickest layer)	1.00	wetness (limited)	0.95
	shrink-swell (slightly limited)	0.18	too acid (moderately limited)	0.42	excess fines (bottom layer)	0.70	excess fines (bottom layer)	1.00	cutbanks cave (slightly limited)	0.29
			slope (slightly limited)	0.16					slope (slightly limited)	0.16

Table 15.--Construction Materials and Excavating--Continued

Map symbol and soil name	Roadfill		Topsoil		Source for sand		Source for gravel		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70C2:										
Dawn----------	Very limited:		Limited:		Improbable:		Improbable:		Very limited:	
	depth to bedrock	1.00	wetness	0.86	excess fines	1.00	excess fines	1.00	wetness	1.00
	(very limited)		(limited)		(thickest layer)		(thickest layer)		(very limited)	
	wetness	0.86	depth to bedrock	0.75	excess fines	1.00	excess fines	1.00	cutbanks cave	0.29
	(limited)		(limited)		(bottom layer)		(bottom layer)		(slightly limited)	
			small stones	0.12					soft bedrock	0.03
			(slightly limited)						(slightly limited)	
72F:										
Gosport-------	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength	1.00	slope >15%	1.00	excess fines	1.00	excess fines	1.00	slope >15%	1.00
	(very limited)		(very limited)		(thickest layer)		(thickest layer)		(very limited)	
	shrink-swell	1.00	too clayey	1.00	excess fines	1.00	excess fines	1.00	too clayey	0.33
	(very limited)		(very limited)		(bottom layer)		(bottom layer)		(moderately limited)	
	depth to bedrock	1.00	too acid	0.60					cutbanks cave	0.29
	(very limited)		(limited)						(slightly limited)	
73:										
Sandover------	Moderately limited:		Very limited:		Possible:		Improbable:		Very limited:	
	wetness	0.33	too sandy	1.00	possible source	0.10	excess fines	1.00	cutbanks cave	1.00
	(moderately limited)		(very limited)		(thickest layer)		(thickest layer)		(very limited)	
			wetness	0.33	possible source	0.10	excess fines	1.00	wetness	1.00
			(moderately limited)		(bottom layer)		(bottom layer)		(very limited)	
			too acid	0.14					flooding	0.60
			(slightly limited)						(moderately limited)	
74:										
Dockery-------	Limited:		Limited:		Improbable:		Improbable:		Very limited:	
	wetness	0.86	wetness	0.86	excess fines	1.00	excess fines	1.00	wetness	1.00
	(limited)		(limited)		(thickest layer)		(thickest layer)		(very limited)	
	shrink-swell	0.45			excess fines	1.00	excess fines	1.00	flooding	0.60
	(moderately limited)				(bottom layer)		(bottom layer)		(moderately limited)	
									cutbanks cave	0.29
									(slightly limited)	
78:										
Colo----------	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength	1.00	wetness	1.00	excess fines	1.00	excess fines	1.00	wetness	1.00
	(very limited)		(very limited)		(thickest layer)		(thickest layer)		(very limited)	
	wetness	1.00	too acid	0.10	excess fines	1.00	excess fines	1.00	flooding	0.60
	(very limited)		(slightly limited)		(bottom layer)		(bottom layer)		(moderately limited)	
	shrink-swell	0.45							cutbanks cave	0.29
	(moderately limited)								(slightly limited)	

Table 15.--Construction Materials and Excavating--Continued

Map symbol and soil name	Roadfill		Topsoil		Source for sand		Source for gravel		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
80:										
Tice	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	wetness	1.00	wetness	1.00	excess fines	1.00	excess fines	1.00	wetness	1.00
	(very limited)		(very limited)		(thickest layer)		(thickest layer)		(very limited)	
	shrink-swell	0.45	too acid	0.08	excess fines	1.00	excess fines	1.00	flooding	0.60
	(moderately limited)		(slightly limited)		(bottom layer)		(bottom layer)		(moderately limited)	
	low strength	0.22							cutbanks cave	0.29
	(slightly limited)								(slightly limited)	
81:										
Tice	Limited:		Limited:		Improbable:		Improbable:		Very limited:	
	wetness	0.93	wetness	0.93	excess fines	1.00	excess fines	1.00	wetness	1.00
	(limited)		(limited)		(thickest layer)		(thickest layer)		(very limited)	
	shrink-swell	0.45	too acid	0.42	excess fines	1.00	excess fines	1.00	flooding	0.60
	(moderately limited)		(moderately limited)		(bottom layer)		(bottom layer)		(moderately limited)	
	low strength	0.22							cutbanks cave	0.29
	(slightly limited)								(slightly limited)	
82A:										
Triplett	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength	1.00	too clayey	1.00	excess fines	1.00	excess fines	1.00	wetness	1.00
	(very limited)		(very limited)		(thickest layer)		(thickest layer)		(very limited)	
	wetness	1.00	wetness	1.00	excess fines	1.00	excess fines	1.00	too clayey	0.51
	(very limited)		(very limited)		(bottom layer)		(bottom layer)		(moderately limited)	
	shrink-swell	1.00	too acid	0.30					cutbanks cave	0.29
	(very limited)		(slightly limited)						(slightly limited)	
84:										
Vesser	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength	1.00	wetness	1.00	excess fines	1.00	excess fines	1.00	wetness	1.00
	(very limited)		(very limited)		(thickest layer)		(thickest layer)		(very limited)	
	wetness	1.00	too acid	0.54	excess fines	1.00	excess fines	1.00	flooding	0.60
	(very limited)		(moderately limited)		(bottom layer)		(bottom layer)		(moderately limited)	
	shrink-swell	0.45							cutbanks cave	0.29
	(moderately limited)								(slightly limited)	
92:										
Carlow	Very limited:		Very limited:		Improbable:		Improbable:		Very limited:	
	low strength	1.00	too clayey	1.00	excess fines	1.00	excess fines	1.00	wetness	1.00
	(very limited)		(very limited)		(thickest layer)		(thickest layer)		(very limited)	
	wetness	1.00	wetness	1.00	excess fines	1.00	excess fines	1.00	too clayey	0.66
	(very limited)		(very limited)		(bottom layer)		(bottom layer)		(limited)	
	shrink-swell	1.00	too acid	0.30					flooding	0.60
	(very limited)		(slightly limited)						(moderately limited)	

Table 15.--Construction Materials and Excavating--Continued

Map symbol and soil name	Roadfill		Topsoil		Source for sand		Source for gravel		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
94:										
Zook	Very limited: low strength (very limited) wetness (very limited) shrink-swell (very limited)	1.00 1.00 1.00	Very limited: wetness (very limited) too clayey (very limited) too acid (slightly limited)	1.00 1.00 0.10	Improbable: excess fines (thickest layer) excess fines (bottom layer)	1.00 1.00	Improbable: excess fines (thickest layer) excess fines (bottom layer)	1.00 1.00	Very limited: wetness (very limited) flooding (moderately limited) too clayey (moderately limited)	1.00 0.60 0.49
98:										
Wabash	Very limited: shrink-swell (very limited) low strength (very limited) wetness (very limited)	1.00 1.00 1.00	Very limited: too clayey (very limited) wetness (very limited) too acid (slightly limited)	1.00 1.00 0.26	Improbable: excess fines (thickest layer) excess fines (bottom layer)	1.00 1.00	Improbable: excess fines (thickest layer) excess fines (bottom layer)	1.00 1.00	Very limited: wetness (very limited) too clayey (limited) flooding (moderately limited)	1.00 0.64 0.60
99F:										
Putco	Very limited: shrink-swell (very limited) low strength (very limited)	1.00 1.00	Very limited: too clayey (very limited) small stones >20% (very limited) area reclaim (limited)	1.00 1.00 0.68	Improbable: excess fines (thickest layer) excess fines (bottom layer)	1.00 1.00	Improbable: excess fines (thickest layer) excess fines (bottom layer)	1.00 1.00	Moderately limited: too clayey (moderately limited) slope (moderately limited) cutbanks cave (slightly limited)	0.60 0.37 0.29
Pits	Not rated		Not rated		Not rated		Not rated		Not rated	
Dumps	Not rated		Not rated		Not rated		Not rated		Not rated	
99002:										
Orthents	Moderately limited: shrink-swell (moderately limited)	0.45	Slightly limited: too clayey (slightly limited)	0.02	Improbable: excess fines (thickest layer) excess fines (bottom layer)	1.00 1.00	Improbable: excess fines (thickest layer) excess fines (bottom layer)	1.00 1.00	Not limited	
99005:										
Orthents	Not rated		Not rated		Not rated		Not rated		Not rated	
M-W:										
Miscellaneous water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 15.--Construction Materials and Excavating--Continued

Map symbol and soil name	Roadfill		Topsoil		Source for sand		Source for gravel		Shallow excavations	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
W:										
Water---------	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 16.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10A:										
Sturges	Not limited		Very limited:		Limited:		Very limited:		Very limited:	
			wetness	1.00	erodes easily	0.90	erodes easily	1.00	wetness	1.00
			(very limited)		(limited)		(very limited)		(very limited)	
			percs slowly	0.76	percs slowly	0.76	wetness	1.00	erodes easily	0.90
			(limited)		(limited)		(very limited)		(limited)	
			slope	0.02	slope	0.02				
			(slightly limited)		(slightly limited)					
12A:										
Crestmeade	Not limited		Very limited:		Limited:		Very limited:		Very limited:	
			wetness	1.00	erodes easily	0.90	erodes easily	1.00	wetness	1.00
			(very limited)		(limited)		(very limited)		(very limited)	
			percs slowly	0.60	percs slowly	0.60	wetness	1.00	erodes easily	0.90
			(moderately limited)		(moderately limited)		(very limited)		(limited)	
14B:										
Grundy	Slightly limited:		Limited:		Limited:		Limited:		Limited:	
	slope	0.11	percs slowly	0.76	erodes easily	0.90	erodes easily	0.88	erodes easily	0.90
	(slightly limited)		(limited)		(limited)		(limited)		(limited)	
			wetness	0.60	percs slowly	0.76	wetness	0.60	wetness	0.60
			(moderately limited)		(limited)		(moderately limited)		(moderately limited)	
			slope	0.50	slope	0.50	slope	0.11	slope	0.11
			(moderately limited)		(moderately limited)		(slightly limited)		(slightly limited)	
20F:										
Locksprings	Limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope	0.89	slope >6%	1.00	slope >6%	1.00	large stones	1.00	large stones	1.00
	(limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	depth to bedrock	0.88	wetness	0.60	droughty	0.71	depth to bedrock	1.00	slope	0.89
	(limited)		(moderately limited)		(limited)		(very limited)		(limited)	
			depth to bedrock	0.42	slow intake	0.60	slope	0.89	depth to bedrock	0.88
			(moderately limited)		(moderately limited)		(limited)		(limited)	

Table 16.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
21B:										
Weller--------	Slightly limited:		Moderately limited:		Limited:		Very limited:		Limited:	
	slope	0.11	slope	0.50	erodes easily	0.90	erodes easily	1.00	erodes easily	0.90
	(slightly limited)		(moderately limited)		(limited)		(very limited)		(limited)	
			wetness	0.44	slope	0.50	wetness	0.44	wetness	0.44
			(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
							slope	0.11	slope	0.11
							(slightly limited)		(slightly limited)	
22C:										
Weller--------	Moderately limited:		Limited:		Limited:		Very limited:		Limited:	
	slope	0.31	slope	0.98	slope	0.98	erodes easily	1.00	erodes easily	0.90
	(moderately limited)		(limited)		(limited)		(very limited)		(limited)	
			percs slowly	0.76	erodes easily	0.90	wetness	0.44	wetness	0.44
			(limited)		(limited)		(moderately limited)		(moderately limited)	
			wetness	0.44	percs slowly	0.76	slope	0.31	slope	0.31
			(moderately limited)		(limited)		(moderately limited)		(moderately limited)	
26C2:										
Chillicothe---	Moderately limited:		Very limited:		Very limited:		Limited:		Limited:	
	potential seepage	0.50	slope >6%	1.00	slope >6%	1.00	erodes easily	0.88	erodes easily	0.90
	(moderately limited)		(very limited)		(very limited)		(limited)		(limited)	
	slope	0.46	percs slowly	0.60	erodes easily	0.90	slope	0.46	slope	0.46
	(moderately limited)		(moderately limited)		(limited)		(moderately limited)		(moderately limited)	
	depth to bedrock	0.05	wetness	0.44	percs slowly	0.60	wetness	0.44	wetness	0.44
	(slightly limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
28C:										
Greenton------	Moderately limited:		Very limited:		Very limited:		Limited:		Limited:	
	slope	0.46	slope >6%	1.00	slope >6%	1.00	wetness	0.94	wetness	0.94
	(moderately limited)		(very limited)		(very limited)		(limited)		(limited)	
			wetness	0.94	erodes easily	0.90	erodes easily	0.88	erodes easily	0.90
			(limited)		(limited)		(limited)		(limited)	
			percs slowly	0.76	percs slowly	0.76	slope	0.46	slope	0.46
			(limited)		(limited)		(moderately limited)		(moderately limited)	
28D2:										
Greenton------	Limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope	0.80	slope >6%	1.00	slope >6%	1.00	wetness	1.00	wetness	1.00
	(limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	depth to bedrock	0.55	wetness	1.00	percs slowly	0.76	slope	0.80	slope	0.80
	(moderately limited)		(very limited)		(limited)		(limited)		(limited)	
			percs slowly	0.76	slow intake	0.60	erodes easily	0.45	depth to bedrock	0.55
			(limited)		(moderately limited)		(moderately limited)		(moderately limited)	

Table 16.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
30B:										
Sampsel--------	Slightly limited:		Very limited:		Moderately limited:		Very limited:		Very limited:	
	slope	0.11	wetness	1.00	percs slowly	0.60	wetness	1.00	wetness	1.00
	(slightly limited)		(very limited)		(moderately limited)		(very limited)		(very limited)	
			percs slowly	0.60	slow intake	0.60	erodes easily	0.88	slope	0.11
			(moderately limited)		(moderately limited)		(limited)		(slightly limited)	
			slope	0.50	slope	0.50	slope	0.11		
			(moderately limited)		(moderately limited)		(slightly limited)			
34B2:										
Lagonda--------	Slightly limited:		Limited:		Limited:		Very limited:		Limited:	
	slope	0.11	percs slowly	0.76	erodes easily	0.90	erodes easily	1.00	erodes easily	0.90
	(slightly limited)		(limited)		(limited)		(very limited)		(limited)	
			wetness	0.60	percs slowly	0.76	wetness	0.60	wetness	0.60
			(moderately limited)		(limited)		(moderately limited)		(moderately limited)	
			slope	0.50	slope	0.50	slope	0.11	slope	0.11
			(moderately limited)		(moderately limited)		(slightly limited)		(slightly limited)	
34C2:										
Lagonda--------	Moderately limited:		Very limited:		Very limited:		Limited:		Limited:	
	slope	0.46	slope >6%	1.00	slope >6%	1.00	erodes easily	0.88	erodes easily	0.90
	(moderately limited)		(very limited)		(very limited)		(limited)		(limited)	
			percs slowly	0.76	erodes easily	0.90	wetness	0.60	wetness	0.60
			(limited)		(limited)		(moderately limited)		(moderately limited)	
			wetness	0.60	percs slowly	0.76	slope	0.46	slope	0.46
			(moderately limited)		(limited)		(moderately limited)		(moderately limited)	
36D2:										
Lamoni---------	Limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope	0.70	slope >6%	1.00	slope >6%	1.00	wetness	1.00	wetness	1.00
	(limited)		(very limited)		(very limited)		(very limited)		(very limited)	
			percs slowly	1.00	percs slowly	1.00	slope	0.70	slope	0.70
			(very limited)		(very limited)		(limited)		(limited)	
			wetness	1.00			erodes easily	0.60		
			(very limited)				(limited)			
62D2:										
Caleb----------	Very limited:		Very limited:		Very limited:		Very limited:		Limited:	
	probable seepage	1.00	slope >6%	1.00	slope >6%	1.00	erodes easily	1.00	erodes easily	0.90
	(very limited)		(very limited)		(very limited)		(very limited)		(limited)	
	slope	0.80			erodes easily	0.90	slope	0.80	slope	0.80
	(limited)				(limited)		(limited)		(limited)	

Table 16.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70C2:										
Dawn----------	Very limited:		Very limited:		Very limited:		Very limited:		Limited:	
	probable seepage (very limited)	1.00	slope >6% (very limited)	1.00	slope >6% (very limited)	1.00	erodes easily (very limited)	1.00	depth to bedrock (limited)	0.75
	depth to bedrock (limited)	0.75	wetness (moderately limited)	0.60	depth to bedrock (slightly limited)	0.09	depth to bedrock (very limited)	1.00	slope (moderately limited)	0.60
	slope (moderately limited)	0.60	depth to bedrock (slightly limited)	0.09			slope (moderately limited)	0.60	wetness (moderately limited)	0.60
72F:										
Gosport-------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	slope >12% (very limited)	1.00	slope >6% (very limited)	1.00	slope >6% (very limited)	1.00	slope >12% (very limited)	1.00	slope >12% (very limited)	1.00
	depth to bedrock (limited)	0.73	percs slowly (very limited)	1.00	percs slowly (very limited)	1.00	erodes easily (very limited)	1.00	erodes easily (limited)	0.90
			depth to bedrock (slightly limited)	0.03	erodes easily (limited)	0.90	depth to bedrock (very limited)	1.00	depth to bedrock (limited)	0.73
73:										
Sandover------	Very limited:		Very limited:		Limited:		Very limited:		Moderately limited:	
	probable seepage (very limited)	1.00	flooding (very limited)	1.00	flooding (limited)	0.90	too sandy (very limited)	1.00	wetness (moderately limited)	0.39
			cutbanks cave (limited)	0.90	droughty (slightly limited)	0.26	wetness (moderately limited)	0.39	droughty (slightly limited)	0.26
			wetness (moderately limited)	0.39			erodes easily (slightly limited)	0.06		
74:										
Dockery-------	Moderately limited:		Very limited:		Limited:		Very limited:		Limited:	
	potential seepage (moderately limited)	0.50	flooding (very limited)	1.00	flooding (limited)	0.90	erodes easily (very limited)	1.00	erodes easily (limited)	0.90
			wetness (moderately limited)	0.60	erodes easily (limited)	0.90	wetness (moderately limited)	0.60	wetness (moderately limited)	0.60
78:										
Colo----------	Moderately limited:		Very limited:		Limited:		Very limited:		Very limited:	
	potential seepage (moderately limited)	0.50	wetness (very limited)	1.00	erodes easily (limited)	0.90	erodes easily (very limited)	1.00	wetness (very limited)	1.00
			flooding (moderately limited)	0.60	flooding (moderately limited)	0.60	wetness (very limited)	1.00	erodes easily (limited)	0.90
80:										
Tice----------	Moderately limited:		Very limited:		Limited:		Very limited:		Very limited:	
	potential seepage (moderately limited)	0.50	flooding (very limited)	1.00	flooding (limited)	0.90	erodes easily (very limited)	1.00	wetness (very limited)	1.00
			wetness (very limited)	1.00	erodes easily (limited)	0.90	wetness (very limited)	1.00	erodes easily (limited)	0.90

Table 16.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
81:										
Tice----------	Moderately limited: potential seepage (moderately limited)	0.50	Limited: wetness (limited) percs slowly (moderately limited) flooding (moderately limited)	0.73 0.60 0.60	Limited: slow intake (limited) percs slowly (moderately limited) flooding (moderately limited)	0.63 0.60 0.60	Very limited: erodes easily (very limited) wetness (limited)	1.00 0.73	Limited: wetness (limited)	0.73
82A:										
Triplett------	Not limited		Very limited: wetness (very limited) percs slowly (limited) slope (slightly limited)	1.00 0.76 0.02	Limited: erodes easily (limited) percs slowly (limited) slope (slightly limited)	0.90 0.76 0.02	Very limited: erodes easily (very limited) wetness (very limited)	1.00 1.00	Very limited: wetness (very limited) erodes easily (limited)	1.00 0.90
84:										
Vesser--------	Moderately limited: potential seepage (moderately limited)	0.50	Very limited: wetness (very limited) flooding (moderately limited)	1.00 0.60	Limited: erodes easily (limited) flooding (moderately limited)	0.90 0.60	Very limited: erodes easily (very limited) wetness (very limited)	1.00 1.00	Very limited: wetness (very limited) erodes easily (limited)	1.00 0.90
92:										
Carlow--------	Not limited		Very limited: flooding (very limited) wetness (very limited) percs slowly (limited)	1.00 1.00 0.76	Limited: flooding (limited) percs slowly (limited) slow intake (limited)	0.90 0.76 0.64	Very limited: wetness (very limited) erodes easily (limited)	1.00 0.60	Very limited: wetness (very limited)	1.00
94:										
Zook----------	Not limited		Very limited: flooding (very limited) wetness (very limited) percs slowly (moderately limited)	1.00 1.00 0.60	Limited: flooding (limited) erodes easily (limited) percs slowly (moderately limited)	0.90 0.90 0.60	Very limited: wetness (very limited) erodes easily (limited)	1.00 0.88	Very limited: wetness (very limited) erodes easily (limited)	1.00 0.90

Table 16.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
98:										
Wabash	Not limited		Very limited: flooding (very limited) wetness (very limited) percs slowly (very limited)	 1.00 1.00 1.00 	Very limited: percs slowly (very limited) flooding (limited) slow intake (limited)	 1.00 0.90 0.82 	Very limited: wetness (very limited) erodes easily (moderately limited)	 1.00 0.45 	Very limited: wetness (very limited)	 1.00
99F:										
Putco	Limited: slope (limited)	 0.89 	Very limited: slope >6% (very limited) percs slowly (limited) small stones (limited)	 1.00 0.76 0.68 	Very limited: slope >6% (very limited) percs slowly (limited) slow intake (moderately limited)	 1.00 0.76 0.60 	Limited: slope (limited) erodes easily (moderately limited)	 0.89 0.45 	Limited: slope (limited)	 0.89
Pits	Not rated		Not rated		Not rated		Not rated		Not rated	
Dumps	Not rated		Not rated		Not rated		Not rated		Not rated	
99002:										
Orthents	Slightly limited: potential seepage (slightly limited) slope (slightly limited)	 0.30 0.11 	Very limited: percs slowly (very limited) slope (moderately limited)	 1.00 0.50 	Very limited: percs slowly (very limited) slope (moderately limited)	 1.00 0.50 	Limited: erodes easily (limited) slope (slightly limited)	 0.60 0.11 	Slightly limited: slope (slightly limited)	 0.11
99005:										
Orthents	Not rated		Not rated		Not rated		Not rated		Not rated	
M-W:										
Miscellaneous water	Not rated		Not rated		Not rated		Not rated		Not rated	
W:										
Water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 17.--Waste Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10A:										
Sturges	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	ground water <72"	1.00
	(limited)		(limited)		(limited)		(very limited)		(very limited)	
	intake rate	0.80	intake rate	0.80	intake rate	0.80	intake rate	0.80	intake rate	0.80
	(limited)		(limited)		(limited)		(limited)		(limited)	
12A:										
Crestmeade	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	ground water <72"	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	intake rate	0.80	intake rate	0.80	intake rate	0.80	intake rate	0.80	intake rate	0.80
	(limited)		(limited)		(limited)		(limited)		(limited)	
14B:										
Grundy	Limited:		Limited:		Limited:		Limited:		Very limited:	
	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	percs slowly	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	wetness	0.60	wetness	0.60	wetness	0.60	wetness	0.60	ground water <72"	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	
	intake rate	0.50	intake rate	0.50	intake rate	0.50	intake rate	0.50	intake rate	0.50
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
20F:										
Locksprings	Limited:		Limited:		Limited:		Very limited:		Very limited:	
	droughty	0.71	droughty	0.71	slope	0.89	depth to bedrock	1.00	percs slowly	1.00
	(limited)		(limited)		(limited)		(very limited)		(very limited)	
	slope	0.67	slope	0.67	droughty	0.71	slope	0.89	slope >7%	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	wetness	0.60	wetness	0.60	wetness	0.60	wetness	0.60	ground water <72"	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	

Table 17.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
21B:										
Weller--------	Limited:		Very limited:		Limited:		Limited:		Very limited:	
	percs slowly (limited)	0.99	low adsorption (very limited)	1.00	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (very limited)	1.00
	intake rate (moderately limited)	0.50	percs slowly (limited)	0.99	intake rate (moderately limited)	0.50	intake rate (moderately limited)	0.50	ground water <72" (very limited)	1.00
	wetness (moderately limited)	0.44	intake rate (moderately limited)	0.50	wetness (moderately limited)	0.44	wetness (moderately limited)	0.44	intake rate (moderately limited)	0.50
22C:										
Weller--------	Limited:		Very limited:		Limited:		Limited:		Very limited:	
	percs slowly (limited)	0.99	low adsorption (very limited)	1.00	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (very limited)	1.00
	intake rate (moderately limited)	0.50	percs slowly (limited)	0.99	intake rate (moderately limited)	0.50	intake rate (moderately limited)	0.50	ground water <72" (very limited)	1.00
	wetness (moderately limited)	0.44	intake rate (moderately limited)	0.50	wetness (moderately limited)	0.44	wetness (moderately limited)	0.44	slope (limited)	0.79
26C2:										
Chillicothe---	Limited:		Limited:		Limited:		Limited:		Very limited:	
	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (limited)	0.60	percs slowly (very limited)	1.00
	wetness (moderately limited)	0.44	wetness (moderately limited)	0.44	slope (moderately limited)	0.46	slope (moderately limited)	0.46	ground water <72" (very limited)	1.00
	intake rate (slightly limited)	0.20	intake rate (slightly limited)	0.20	wetness (moderately limited)	0.44	wetness (moderately limited)	0.44	depth to bedrock (very limited)	1.00
28C:										
Greenton------	Limited:		Limited:		Limited:		Limited:		Very limited:	
	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (very limited)	1.00
	wetness (limited)	0.94	wetness (limited)	0.94	wetness (limited)	0.94	wetness (limited)	0.94	ground water <72" (very limited)	1.00
	intake rate (moderately limited)	0.50	intake rate (moderately limited)	0.50	intake rate (moderately limited)	0.50	intake rate (moderately limited)	0.50	slope (limited)	0.98
28D2:										
Greenton------	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	percs slowly (very limited)	1.00
	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (limited)	0.99	slope >7% (very limited)	1.00
	slope (moderately limited)	0.59	slope (moderately limited)	0.59	slope (limited)	0.80	slope (limited)	0.80	depth to bedrock (very limited)	1.00

Table 17.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
30B:										
Sampsel	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	intake rate	0.80	intake rate	0.80	intake rate	0.80	intake rate	0.80	ground water <72"	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	percs slowly	0.60	percs slowly	0.60	percs slowly	0.60	percs slowly	0.60	intake rate	0.80
	(limited)		(limited)		(limited)		(limited)		(limited)	
34B2:										
Lagonda	Limited:		Limited:		Limited:		Limited:		Very limited:	
	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	percs slowly	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	wetness	0.60	wetness	0.60	wetness	0.60	wetness	0.60	ground water <72"	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	
	intake rate	0.50	intake rate	0.50	intake rate	0.50	intake rate	0.50	intake rate	0.50
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
34C2:										
Lagonda	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	low adsorption	1.00	low adsorption	1.00	low adsorption	1.00	low adsorption	1.00	percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	ground water <72"	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	wetness	0.60	wetness	0.60	wetness	0.60	wetness	0.60	slope	0.98
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(limited)	
36D2:										
Lamoni	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	percs slowly	1.00	percs slowly	1.00	percs slowly	1.00	percs slowly	1.00	percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	slope >7%	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	intake rate	0.50	intake rate	0.50	slope	0.70	slope	0.70	ground water <72"	1.00
	(moderately limited)		(moderately limited)		(limited)		(limited)		(very limited)	
62D2:										
Caleb	Moderately limited:		Moderately limited:		Limited:		Limited:		Very limited:	
	slope	0.59	slope	0.59	slope	0.80	slope	0.80	percs slowly	1.00
	(moderately limited)		(moderately limited)		(limited)		(limited)		(very limited)	
	intake rate	0.20	intake rate	0.20	intake rate	0.20	intake rate	0.20	slope >7%	1.00
	(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)		(very limited)	
									ground water <72"	1.00
									(very limited)	

Table 17.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
70C2:										
Dawn	Very limited: poor filter (very limited) wetness (moderately limited) slope (slightly limited)	1.00 0.60 0.29	Very limited: poor filter (very limited) wetness (moderately limited) slope (slightly limited)	1.00 0.60 0.29	Very limited: poor filter (very limited) slope (moderately limited) wetness (moderately limited)	1.00 0.60 0.60	Very limited: depth to bedrock (very limited) poor filter (very limited) slope (moderately limited)	1.00 1.00 0.60	Very limited: percs slowly (very limited) ground water <72" (very limited) slope >7% (very limited)	1.00 1.00 1.00
72F:										
Gosport	Very limited: percs slowly (very limited) slope >15% (very limited) intake rate (moderately limited)	1.00 1.00 0.50	Very limited: percs slowly (very limited) slope >15% (very limited) intake rate (moderately limited)	1.00 1.00 0.50	Very limited: percs slowly (very limited) slope >12% (very limited) intake rate (moderately limited)	1.00 1.00 0.50	Very limited: slope >12% (very limited) percs slowly (very limited) depth to bedrock (very limited)	1.00 1.00 1.00	Very limited: percs slowly (very limited) slope >7% (very limited) depth to bedrock (very limited)	1.00 1.00 1.00
73:										
Sandover	Very limited: flooding (very limited) poor filter (very limited) wetness (moderately limited)	1.00 1.00 0.39	Very limited: flooding (very limited) poor filter (very limited) wetness (moderately limited)	1.00 1.00 0.39	Very limited: flooding (very limited) poor filter (very limited) wetness (moderately limited)	1.00 1.00 0.39	Very limited: flooding (very limited) poor filter (very limited) wetness (moderately limited)	1.00 1.00 0.39	Very limited: ground water <72" (very limited) flooding (very limited) poor filter (very limited)	1.00 1.00 1.00
74:										
Dockery	Very limited: flooding (very limited) wetness (moderately limited) intake rate (moderately limited)	1.00 0.60 0.50	Very limited: flooding (very limited) wetness (moderately limited) intake rate (moderately limited)	1.00 0.60 0.50	Very limited: flooding (very limited) wetness (moderately limited) intake rate (moderately limited)	1.00 0.60 0.50	Very limited: flooding (very limited) wetness (moderately limited) intake rate (moderately limited)	1.00 0.60 0.50	Very limited: percs slowly (very limited) ground water <72" (very limited) flooding (very limited)	1.00 1.00 1.00
78:										
Colo	Very limited: wetness (very limited) flooding (limited) intake rate (limited)	1.00 0.90 0.80	Very limited: wetness (very limited) flooding (limited) intake rate (limited)	1.00 0.90 0.80	Very limited: wetness (very limited) flooding (limited) intake rate (limited)	1.00 0.90 0.80	Very limited: wetness (very limited) flooding (limited) intake rate (limited)	1.00 0.90 0.80	Very limited: percs slowly (very limited) ground water <72" (very limited) intake rate (limited)	1.00 1.00 0.80

Table 17.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
80:										
Tice	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	flooding	1.00	flooding	1.00	flooding	1.00	flooding	1.00	percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	ground water <72"	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	intake rate	0.20	intake rate	0.20	intake rate	0.20	intake rate	0.20	flooding	1.00
	(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)		(very limited)	
81:										
Tice	Limited:		Limited:		Limited:		Limited:		Very limited:	
	flooding	0.90	flooding	0.90	flooding	0.90	flooding	0.90	percs slowly	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	wetness	0.73	wetness	0.73	wetness	0.73	wetness	0.73	ground water <72"	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	percs slowly	0.60	percs slowly	0.60	percs slowly	0.60	percs slowly	0.60	flooding	0.60
	(limited)		(limited)		(limited)		(limited)		(moderately limited)	
82A:										
Triplett	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	ground water <72"	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	intake rate	0.80	intake rate	0.80	intake rate	0.80	intake rate	0.80	intake rate	0.80
	(limited)		(limited)		(limited)		(limited)		(limited)	
84:										
Vesser	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	wetness	1.00	percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	0.90	flooding	0.90	flooding	0.90	flooding	0.90	ground water <72"	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	intake rate	0.50	intake rate	0.50	intake rate	0.50	intake rate	0.50	flooding	0.60
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
92:										
Carlow	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness	1.00	wetness	1.00	wetness	1.00	flooding	1.00	percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	flooding	1.00	flooding	1.00	flooding	1.00	wetness	1.00	ground water <72"	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	percs slowly	0.99	flooding	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	

Table 17.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
94:										
Zook	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	flooding (very limited)	1.00	percs slowly (very limited)	1.00
	flooding (very limited)	1.00	flooding (very limited)	1.00	flooding (very limited)	1.00	wetness (very limited)	1.00	ground water <72" (very limited)	1.00
	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (limited)	0.99	flooding (very limited)	1.00
98:										
Wabash	Very limited:		Very limited:		Very limited:		Very limited:		Very limited:	
	wetness (very limited)	1.00	wetness (very limited)	1.00	percs slowly (very limited)	1.00	flooding (very limited)	1.00	percs slowly (very limited)	1.00
	flooding (very limited)	1.00	percs slowly (very limited)	1.00	wetness (very limited)	1.00	wetness (very limited)	1.00	ground water <72" (very limited)	1.00
	percs slowly (very limited)	1.00	flooding (very limited)	1.00	flooding (very limited)	1.00	percs slowly (very limited)	1.00	flooding (very limited)	1.00
99F:										
Putco	Limited:		Limited:		Limited:		Limited:		Very limited:	
	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (limited)	0.99	percs slowly (very limited)	1.00
	slope (limited)	0.67	slope (limited)	0.67	slope (limited)	0.89	slope (limited)	0.89	slope >7% (very limited)	1.00
	intake rate (slightly limited)	0.20	intake rate (slightly limited)	0.20	intake rate (slightly limited)	0.20	intake rate (slightly limited)	0.20	intake rate (slightly limited)	0.20
Pits	Not rated		Not rated		Not rated		Not rated		Not rated	
Dumps	Not rated		Not rated		Not rated		Not rated		Not rated	
99002:										
Orthents	Very limited:		Very limited:		Very limited:		Very limited:		Slightly limited:	
	low adsorption (very limited)	1.00	low adsorption (very limited)	1.00	low adsorption (very limited)	1.00	low adsorption (very limited)	1.00	slope (moderately limited)	0.40
					slope (slightly limited)	0.11	slope (slightly limited)	0.11		
99005:										
Orthents	Not rated		Not rated		Not rated		Not rated		Not rated	
M-W:										
Miscellaneous water	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 17.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
W:										
Water---------	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 18.--Engineering Index Properties

(Absence of an entry indicates that data were not estimated. For an explanation of the abbreviations in the USDA texture column, see "Texture, soil" in the Glossary)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
10A:												
Sturges---------	0-9	SIL	CL	A-6	0	0	100	100	90-100	90-100	25-40	5-15
	9-12	SIL	CL	A-6	0	0	100	100	90-100	90-100	25-40	5-15
	12-20	C	CH	A-7	0	0	100	100	90-100	75-95	55-75	30-45
	20-30	SIC	CH	A-7	0	0	100	100	95-100	75-95	55-75	30-45
	30-61	SICL	CH	A-7	0	0	100	100	95-100	85-95	35-60	15-35
	61-80	SICL	CL	A-7	0	0	100	100	95-100	85-95	35-60	15-35
12A:												
Crestmeade------	0-4	SIL	CL	A-4	0	0	100	100	90-100	70-100	25-35	7-15
	4-14	SIL	CL	A-4	0	0	100	100	90-100	70-100	25-35	7-15
	14-26	SIL	CL	A-4	0	0	100	100	90-100	70-100	25-40	7-25
	26-52	SIC	CH	A-7	0	0	100	100	95-100	90-100	42-58	22-35
	52-70	SICL	CL	A-7	0	0	90-100	90-100	85-95	75-95	36-50	17-30
14B:												
Grundy----------	0-13	SIL	CL	A-7	0	0	100	100	95-100	80-100	30-45	10-23
	13-18	SICL	CH	A-7	0	0	100	100	95-100	90-100	45-56	25-35
	18-36	SIC	CH	A-7	0	0	100	100	95-100	90-100	50-70	30-45
	36-70	SICL	CH	A-7	0	0	100	100	90-100	90-100	40-55	25-35
20F:												
Locksprings-----	0-7	SICL	CL	A-7	0	0-15	95-100	90-100	90-100	85-95	35-45	15-25
	7-28	BYV-C	CH	A-7	35-65	0-10	95-100	90-100	90-100	75-95	60-65	35-40
	28-80	UWB	---	---	---	---	---	---	---	---	---	---
21B:												
Weller----------	0-11	SIL	CL	A-6	0	0	100	100	100	95-100	25-40	5-15
	11-40	SIC	CH	A-7	0	0	100	100	100	95-100	45-65	30-40
	40-80	SICL	CL	A-7	0	0	100	100	100	95-100	30-55	10-30
22C:												
Weller----------	0-10	SIL	CL	A-6	0	0	100	100	100	95-100	25-40	5-15
	10-35	SIC	CH	A-7	0	0	100	100	100	95-100	45-65	30-40
	35-60	SICL	CL	A-7	0	0	100	100	100	95-100	30-55	10-30
26C2:												
Chillicothe-----	0-10	SICL	CL	A-6	0	0	100	100	95-100	85-100	25-45	5-25
	10-19	SIC	CH	A-7	0	0	100	100	95-100	90-95	30-60	10-35
	19-50	SICL	CH	A-7	0	0	100	100	95-100	85-95	35-55	15-30
	50-70	SIC	CH	A-7	0	0	95-100	95-100	90-100	90-95	45-65	25-35
	70-80	UWB	---	---	---	---	---	---	---	---	---	---

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
28C:												
Greenton--------	0-13	SICL	CL	A-7	0	0	100	100	95-100	85-95	35-50	15-25
	13-26	SIC	CH	A-7	0	0	100	100	95-100	90-95	50-70	35-45
	26-60	SIC	CH	A-7	0	0-5	70-100	65-100	60-100	55-95	50-70	25-41
28D2:												
Greenton--------	0-6	SICL	CL	A-7	0	0	100	100	95-100	85-95	35-46	15-25
	6-25	SIC	CH	A-7	0	0	100	100	95-100	90-95	50-70	35-45
	25-50	SIC	CH	A-7	0	0-5	70-100	65-100	60-95	55-90	50-70	25-40
	50-60	WB	---	---	---	---	---	---	---	---	---	---
30B:												
Sampsel---------	0-15	SICL	CL	A-7	0	0	100	100	95-100	85-95	35-50	15-25
	15-60	SICL	CH	A-7	0	0	100	85-100	85-100	75-100	52-75	32-47
34B2:												
Lagonda---------	0-9	SICL	CL	A-6	0	0	100	100	95-100	85-95	20-40	15-25
	9-17	SIC	CH	A-7	0	0	100	100	95-100	90-95	40-70	25-40
	17-35	SICL	CH	A-7	0	0	100	100	95-100	85-95	45-60	25-40
	35-47	SIL	CL	A-6	0	0	95-100	90-100	90-100	70-90	40-65	20-40
	47-60	CL	CL	A-7	0	0	95-100	90-100	80-100	70-80	40-65	25-40
34C2:												
Lagonda---------	0-8	SICL	CL	A-7	0	0	100	100	95-100	85-95	40-50	15-25
	8-20	SICL	CH	A-7	0	0	100	100	95-100	85-95	40-70	25-40
	20-53	SICL	CH	A-7	0	0	100	100	95-100	85-95	40-70	25-40
	53-60	CL	CL	A-7	0	0	95-100	90-100	90-100	70-80	28-50	25-40
36D2:												
Lamoni----------	0-7	L	CL	A-6	0	0	95-100	95-100	85-95	60-75	35-45	15-25
	7-37	C	CH	A-7	0	0	95-100	95-100	90-100	75-95	50-65	25-40
	37-60	CL	CH	A-7	0	0	95-100	95-100	85-95	65-80	35-55	15-35
62D2:												
Caleb-----------	0-3	SIL	CL-ML	A-6	0	0	95-100	95-100	90-100	70-95	25-40	5-20
	3-8	FSL	CL-ML	A-4	0	0	90-100	90-100	70-90	40-55	20-45	5-25
	8-13	L	CL	A-6	0	0	90-100	90-100	85-95	60-75	20-40	5-20
	13-47	CL	CL	A-7	0	0	90-100	90-100	90-100	70-80	15-45	15-25
	47-80	SL	CL-ML	A-2	0	0	90-100	90-100	60-75	30-55	15-35	5-15
70C2:												
Dawn----------	0-11	L	CL	A-4	---	0-1	95-100	95-100	85-95	60-75	17-35	1-10
	11-16	L	CL	A-4	---	0-1	95-100	95-100	85-95	60-75	20-35	3-10
	16-24	SL	SM	A-2-4	---	0-2	95-100	90-100	55-70	25-40	20-35	3-10
	24-37	VFSL	SM	A-4	---	0-15	85-100	50-100	50-85	40-50	20-35	3-10
	37-60	WB	---	---	---	---	---	---	---	---	---	---

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
72F:												
Gosport---------	0-6	SIL	CL	A-6	0	0	95-100	90-100	90-100	70-90	25-40	5-15
	6-9	SIL	CL	A-6	0	0	95-100	90-100	90-100	70-90	25-40	5-15
	9-33	SIC	CH	A-7	0	0	95-100	90-100	90-100	85-95	50-65	30-50
	33-39	SIL	CL	A-7	0	0	85-95	80-90	80-90	65-80	25-50	5-25
	39-60	WB	---	---	---	---	---	---	---	---	---	---
73:												
Sandover--------	0-7	L	SC-SM	A-4	0	0	100	100	70-95	40-70	10-20	NP-5
	7-46	S	SM	A-2-4	0	0	100	100	50-80	5-15	5-16	NP-3
	46-60	SR--SIL&S	SM	A-2-4	0	0	100	100	60-90	10-35	10-35	NP-15
74:												
Dockery---------	0-5	SIL	CL	A-4	0	0	100	100	90-100	70-90	25-35	5-15
	5-28	SIL	CL	A-6	0	0	100	100	90-100	70-95	25-40	8-20
	28-60	SIL	CL-ML	A-4	0	0	100	100	90-100	70-90	25-35	5-12
78:												
Colo------------	0-4	SIL	CL	A-6	0	0	100	100	90-100	70-95	25-40	5-15
	4-22	SIL	CL	A-6	0	0	100	100	90-100	70-95	25-40	5-20
	22-44	SICL	CL	A-7	0	0	100	100	95-100	85-100	40-55	20-30
	44-60	SICL	CL	A-7	0	0	100	100	95-100	85-100	40-55	15-30
80:												
Tice------------	0-5	SIL	CL-ML	A-4	0	0	100	100	90-100	70-90	25-45	7-20
	5-22	SICL	CL	A-6	0	0	100	100	95-100	85-95	35-55	15-30
	22-54	SIL	CL	A-4	0	0	100	100	85-100	70-95	25-45	5-20
	54-75	SIL	CL	A-6	0	0	100	100	60-100	55-95	25-45	5-20
81:												
Tice------------	0-4	SIC	CL	A-7	0	0	100	100	95-100	90-95	45-60	20-30
	4-16	SICL	CL	A-6	0	0	100	100	95-100	85-95	35-55	15-30
	16-60	SIL	CL	A-4	0	0	100	100	90-100	70-90	25-45	5-20
82A:												
Triplett--------	0-8	SIL	CL	A-6	0	0	100	100	90-100	70-90	24-35	8-20
	8-16	SIL	CL	A-6	0	0	100	100	90-100	70-95	25-40	12-25
	16-29	SIC	CH	A-7	0	0	100	100	95-100	75-95	55-70	33-45
	29-45	SIC	CH	A-7	0	0	100	100	95-100	75-95	45-55	25-35
	45-70	SICL	CL	A-6	0	0	100	100	90-100	70-95	30-43	11-20
84:												
Vesser----------	0-14	SIL	CL	A-6	0	0	100	100	95-100	95-100	28-40	10-20
	14-33	SIL	CL	A-6	0	0	100	100	95-100	95-100	30-40	10-20
	33-60	SICL	CL	A-7	0	0	100	100	95-100	95-100	40-50	15-25

Table 18.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
92:												
Carlow----------	0-11	SIC	CH	A-7	0	0	100	100	95-100	90-100	40-65	25-40
	11-17	SICL	CH	A-7	0	0	100	100	95-100	85-95	40-65	25-40
	17-60	C	CH	A-7	0	0	100	100	90-100	75-95	45-75	30-50
	60-80	CL	CH	A-7	0	0	100	100	90-100	70-95	45-75	25-50
94:												
Zook----------	0-4	SICL	CH	A-7	0	0	100	100	95-100	95-100	45-65	20-35
	4-46	SIC	CH	A-7	0	0	100	100	95-100	95-100	60-85	35-55
	46-60	SICL	CH	A-7	0	0	100	100	95-100	95-100	35-80	10-50
98:												
Wabash----------	0-26	SIC	CH	A-7	0	0	100	100	100	95-100	50-75	30-50
	26-80	SIC	CH	A-7	0	0	100	100	100	95-100	52-78	30-55
99F:												
Putco----------	0-4	SIC	CL	A-7	0-10	0-15	40-100	35-100	35-95	35-95	35-50	15-25
	4-80	CN-SIC	CH	A-7	0-10	0-5	30-80	25-80	25-80	25-75	45-65	25-40
Pits.												
Dumps.												
99002:												
Orthents--------	0-60	Variable	---	---	---	---	---	---	---	---	---	15-30
	60-80	Variable	---	---	---	---	---	---	---	---	---	---
99005:												
Orthents.												
M-W:												
Miscellaneous water.												
W:												
Water.												

Table 19.--Physical and Chemical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conduc-tivity	Available water capacity	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
											Kw	Kf	T		
	In	Pct	g/cc	um/sec	In/in	meq/100g	meq/100g	pH	Pct	Pct					
10A:															
Sturges------	0-9	15-27	1.35-1.45	4.00-14.00	0.19-0.22	14-20	---	5.1-7.3	3.0-5.9	1.0-4.0	.55	.55	3	6	48
	9-12	15-27	1.35-1.45	4.00-14.00	0.19-0.21	14-20	---	5.1-7.3	3.0-5.9	0.5-3.0	.55	.55			
	12-20	45-60	1.30-1.45	0.42-1.40	0.14-0.17	28-42	---	5.1-7.3	9.0-25.0	0.5-3.0	.24	.24			
	20-30	27-50	1.30-1.45	0.42-1.40	0.15-0.17	28-42	---	5.1-7.3	9.0-15.0	0.5-1.0	.32	.32			
	30-61	27-40	1.35-1.50	1.40-4.00	0.19-0.21	20-30	---	5.6-7.3	6.0-8.9	0.0-0.5	.43	.43			
	61-80	27-40	1.35-1.50	1.40-4.00	0.19-0.21	20-30	---	6.1-7.3	6.0-8.9	0.0-0.5	.49	.49			
12A:															
Crestmeade---	0-4	15-27	1.35-1.50	4.00-14.00	0.19-0.21	10-18	---	5.6-7.3	0.0-2.9	2.0-4.0	.49	.49	3	6	48
	4-14	15-27	1.30-1.50	4.00-14.00	0.19-0.21	10-18	---	5.1-7.3	0.0-2.9	1.0-2.0	.55	.55			
	14-26	13-30	1.30-1.45	1.40-4.00	0.19-0.21	10-18	---	5.1-6.5	3.0-5.9	1.0-4.0	.64	.64			
	26-52	40-60	1.30-1.45	0.42-1.40	0.15-0.17	20-30	---	5.1-7.3	6.0-8.9	1.0-2.0	.32	.32			
	52-70	27-42	1.35-1.50	1.40-4.00	0.19-0.21	15-30	---	5.1-7.3	3.0-5.9	1.0-2.0	.37	.37			
14B:															
Grundy-------	0-13	12-27	1.35-1.50	4.00-14.00	0.19-0.22	8-24	---	5.6-7.3	3.0-5.9	2.0-4.0	.37	.37	3	6	48
	13-18	32-45	1.35-1.45	1.40-4.00	0.16-0.19	16-28	---	5.1-6.5	6.0-8.9	0.5-2.3	.32	.32			
	18-36	40-50	1.30-1.40	0.42-1.40	0.11-0.16	20-34	---	5.1-7.3	6.0-8.9	0.0-0.9	.32	.32			
	36-70	28-57	1.35-1.40	0.42-1.40	0.17-0.20	14-28	---	5.6-7.3	6.0-8.9	0.0-0.4	.43	.43			
20F:															
Locksprings--	0-7	20-40	1.10-1.30	4.00-14.00	0.17-0.19	18-30	---	5.6-7.3	3.0-5.9	2.0-5.0	.24	.28	2	6	---
	7-28	40-60	1.30-1.50	0.42-1.40	0.05-0.10	20-40	---	5.6-7.3	6.0-8.9	0.5-2.0	.05	.20			
	28-80	---	---	---	---	---	---	---	---	---	---	---			
21B:															
Weller-------	0-11	16-27	1.35-1.45	4.00-14.00	0.19-0.22	---	15-20	4.5-6.0	0.0-2.9	2.0-3.0	.37	.37	3	6	48
	11-40	28-48	1.35-1.50	0.42-1.40	0.12-0.18	---	30-35	4.5-6.0	6.0-8.9	0.0-0.5	.43	.43			
	40-80	27-40	1.40-1.55	1.40-4.00	0.18-0.20	25-30	---	5.1-6.0	6.0-8.9	0.0-0.5	.43	.43			
22C:															
Weller-------	0-10	16-27	1.35-1.45	4.00-14.00	0.19-0.22	---	15-20	4.5-6.0	0.0-2.9	2.0-3.0	.37	.37	3	6	48
	10-35	28-48	1.35-1.50	0.42-1.40	0.12-0.18	---	30-35	4.5-6.0	6.0-8.9	0.0-0.5	.43	.43			
	35-60	27-40	1.40-1.55	1.40-4.00	0.18-0.20	25-30	---	5.1-6.0	6.0-8.9	0.0-0.5	.43	.43			
26C2:															
Chillicothe--	0-10	22-30	1.10-1.40	4.00-14.00	0.19-0.21	---	---	6.1-6.5	0.0-2.9	2.0-5.0	.37	.37	5	6	48
	10-19	27-45	1.20-1.40	1.40-4.00	0.15-0.17	---	---	5.6-6.0	3.0-5.9	1.0-2.0	.32	.32			
	19-50	34-42	1.20-1.40	4.00-14.00	0.19-0.21	---	---	5.1-5.5	6.0-8.9	0.5-1.0	.37	.37			
	50-70	35-50	1.40-1.60	1.40-4.00	0.15-0.17	---	---	5.6-6.0	3.0-5.9	0.0-1.0	.32	.32			
	70-80	---	---	---	---	---	---	---	---	---	---	---			

Table 19.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conduc-tivity	Available water capacity	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
											Kw	Kf	T		
	In	Pct	g/cc	um/sec	In/in	meq/100g	meq/100g	pH	Pct	Pct					
28C:															
Greenton-----	0-13	27-40	1.30-1.45	1.40-4.00	0.19-0.21	14-18	---	5.6-6.5	3.0-5.9	1.0-3.0	.37	.37	3	7	38
	13-26	35-50	1.35-1.50	0.42-1.40	0.15-0.17	18-25	---	5.6-7.3	6.0-8.9	0.0-1.0	.37	.37			
	26-60	40-50	1.35-1.50	0.42-1.40	0.13-0.16	20-25	---	6.6-7.8	6.0-8.9	0.0-0.5	.24	.28			
28D2:															
Greenton-----	0-6	27-40	1.30-1.45	1.40-4.00	0.19-0.21	14-30	---	5.6-7.3	3.0-5.9	1.0-4.0	.24	.24	3	7	38
	6-25	35-50	1.35-1.50	0.42-1.40	0.15-0.17	18-36	---	5.6-7.3	6.0-8.9	0.0-1.0	.28	.28			
	25-50	40-50	1.35-1.50	0.42-1.40	0.11-0.15	20-35	---	6.6-8.0	6.0-8.9	0.0-0.5	.24	.32			
	50-60	---	---	---	---	---	---	---	---	---	---	---			
30B:															
Sampsel------	0-15	27-35	1.35-1.50	1.40-4.00	0.19-0.22	---	---	5.6-7.3	3.0-5.9	3.0-4.5	.32	.32	2	7	38
	15-60	35-60	1.40-1.60	0.42-1.40	0.19-0.21	---	---	5.6-7.8	6.0-8.9	0.5-1.0	.37	.37			
34B2:															
Lagonda------	0-9	27-32	1.35-1.50	1.40-4.00	0.19-0.21	8-25	---	5.6-7.8	3.0-5.9	2.0-4.0	.37	.37	3	6	48
	9-17	32-50	1.30-1.40	0.42-1.40	0.15-0.17	16-40	---	5.6-7.3	6.0-8.9	0.5-2.0	.28	.28			
	17-35	35-45	1.30-1.40	0.42-1.40	0.19-0.21	16-30	---	5.6-7.3	6.0-8.9	0.5-1.0	.43	.43			
	35-47	20-45	1.30-1.40	0.42-1.40	0.19-0.21	14-23	---	6.6-7.8	6.0-8.9	0.0-0.5	.49	.49			
	47-60	28-45	1.30-1.40	0.42-1.40	0.19-0.21	14-23	---	6.6-7.8	6.0-8.9	0.0-0.5	.37	.43			
34C2:															
Lagonda------	0-8	27-32	1.35-1.50	1.40-4.00	0.19-0.21	---	---	5.6-7.3	3.0-5.9	1.0-3.0	.37	.37	2	7	38
	8-20	32-50	1.30-1.40	0.42-1.40	0.19-0.21	---	---	5.6-7.3	6.0-8.9	0.5-2.0	.37	.37			
	20-53	32-50	1.30-1.40	0.42-1.40	0.19-0.21	---	---	6.1-7.8	6.0-8.9	0.5-2.0	.37	.37			
	53-60	28-45	1.30-1.40	0.42-1.40	0.19-0.21	---	---	6.6-7.8	6.0-8.9	0.0-0.5	.37	.37			
36D2:															
Lamoni-------	0-7	21-27	1.40-1.45	1.40-4.00	0.16-0.18	19-30	---	5.1-7.3	3.0-5.9	2.0-3.5	.32	.32	3	7	38
	7-37	38-50	1.55-1.65	0.01-0.42	0.14-0.16	29-50	---	5.1-6.5	6.0-8.9	0.5-2.0	.24	.24			
	37-60	32-40	1.60-1.70	0.42-1.40	0.18-0.21	25-30	---	5.6-7.3	6.0-8.9	0.0-0.5	.28	.28			
62D2:															
Caleb--------	0-3	14-30	1.45-1.50	4.00-14.00	0.19-0.21	---	---	5.6-7.3	0.0-2.9	1.6-3.0	.64	.64	5	6	48
	3-8	11-30	1.45-1.65	4.00-14.00	0.13-0.15	---	---	5.1-6.0	0.0-2.9	0.0-1.4	.32	.32			
	8-13	19-30	1.45-1.65	4.00-14.00	0.16-0.18	---	---	4.5-6.0	0.0-2.9	0.0-1.2	.32	.32			
	13-47	20-35	1.45-1.65	4.00-14.00	0.19-0.21	---	---	4.5-6.0	3.0-5.9	0.0-1.0	.28	.28			
	47-80	5-30	1.55-1.75	4.00-42.00	0.11-0.13	---	---	4.5-6.0	0.0-2.9	0.0-0.5	.17	.17			
70C2:															
Dawn---------	0-11	8-20	1.30-1.50	14.00-42.00	0.16-0.18	---	---	5.6-7.3	0.0-2.9	1.0-3.0	.32	.32	4	3	86
	11-16	8-18	1.30-1.55	4.00-14.00	0.16-0.18	---	---	5.6-7.8	0.0-2.9	0.5-1.5	.49	.49			
	16-24	10-18	1.35-1.55	4.00-14.00	0.11-0.13	---	---	4.5-7.8	0.0-2.9	0.0-1.0	.37	.43			
	24-37	1-15	1.50-1.70	42.00-141.0	0.12-0.14	---	---	4.5-8.4	0.0-2.9	0.0-1.0	.32	.43			
	37-60	---	---	---	---	---	---	---	---	---	---	---			

Table 19.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conduc-tivity	Available water capacity	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
											Kw	Kf	T		
	In	Pct	g/cc	um/sec	In/in	meq/100g	meq/100g	pH	Pct	Pct					
72F:															
Gosport------	0-6	18-27	1.30-1.40	1.40-4.00	0.19-0.21	---	---	5.1-7.3	3.0-5.9	---	.37	.37	3	7	38
	6-9	18-27	1.30-1.40	1.40-4.00	0.19-0.21	---	---	3.6-5.5	3.0-5.9	---	.49	.49			
	9-33	36-60	1.50-1.60	0.01-0.42	0.14-0.17	---	---	3.6-5.5	6.0-8.9	---	.37	.37			
	33-39	18-27	1.30-1.40	1.40-4.00	0.17-0.19	---	---	3.6-5.5	3.0-5.9	---	.55	.55			
	39-60	---	---	---	---	---	---	---	---	---	---	---			
73:															
Sandover-----	0-7	2-10	1.40-1.60	42.00-141.0	0.13-0.16	2-8	---	4.5-6.5	0.0-2.9	0.5-2.0	.20	.20	---	---	---
	7-46	1-5	1.40-1.60	42.00-141.0	0.06-0.08	2-5	---	4.5-6.5	0.0-2.9	0.0-0.5	.10	.10			
	46-60	2-27	1.20-1.50	4.00-14.00	0.08-0.19	3-15	---	4.5-6.5	3.0-5.9	0.0-0.5	.15	.15			
74:															
Dockery------	0-5	15-27	1.35-1.45	4.00-14.00	0.19-0.22	8-18	---	5.6-7.3	0.0-2.9	2.0-4.0	.49	.49	5	6	48
	5-28	18-30	1.35-1.45	4.00-14.00	0.19-0.21	8-14	---	5.6-7.8	3.0-5.9	0.5-2.0	.49	.49			
	28-60	15-27	1.35-1.45	4.00-14.00	0.19-0.21	8-14	---	5.6-7.3	3.0-5.9	0.5-1.0	.64	.64			
78:															
Colo---------	0-4	15-30	1.25-1.30	4.00-14.00	0.19-0.21	25-30	---	5.6-7.3	3.0-5.9	3.0-5.0	.37	.37	5	6	48
	4-22	15-30	1.25-1.30	4.00-14.00	0.19-0.21	25-30	---	5.6-7.3	3.0-5.9	2.0-5.0	.43	.43			
	22-44	20-35	1.25-1.35	4.00-14.00	0.19-0.21	36-41	---	5.6-7.3	3.0-5.9	1.0-2.0	.37	.37			
	44-60	25-35	1.25-1.35	4.00-14.00	0.19-0.21	36-41	---	6.1-7.3	3.0-5.9	1.0-2.0	.28	.28			
80:															
Tice---------	0-5	14-27	1.25-1.45	4.00-14.00	0.19-0.22	10-22	---	6.1-7.8	3.0-5.9	1.0-3.0	.64	.64	5	6	48
	5-22	24-35	1.25-1.45	4.00-14.00	0.19-0.22	16-23	---	5.6-7.8	3.0-5.9	1.0-2.0	.43	.43			
	22-54	15-30	1.30-1.50	4.00-14.00	0.19-0.21	9-20	---	5.6-7.8	3.0-5.9	0.0-1.0	.64	.64			
	54-75	15-30	1.30-1.50	4.00-14.00	0.19-0.21	9-20	---	5.6-7.8	3.0-5.9	0.0-1.0	.55	.55			
81:															
Tice---------	0-4	40-50	1.25-1.45	1.40-4.00	0.15-0.17	30-35	---	6.1-7.8	6.0-8.9	2.0-3.0	.20	.20	5	7	38
	4-16	22-35	1.30-1.50	4.00-14.00	0.19-0.22	20-27	---	5.6-7.8	3.0-5.9	1.0-3.0	.37	.37			
	16-60	15-30	1.40-1.60	4.00-14.00	0.19-0.21	15-23	---	5.1-7.8	3.0-5.9	0.0-1.0	.55	.55			
82A:															
Triplett-----	0-8	15-27	1.35-1.50	4.00-14.00	0.19-0.22	10-15	---	5.1-7.3	0.0-2.9	1.0-4.0	.37	.37	3	6	48
	8-16	15-30	1.30-1.45	1.40-4.00	0.18-0.21	10-18	---	4.5-7.3	3.0-5.9	0.5-1.0	.43	.43			
	16-29	42-52	1.30-1.45	0.42-1.40	0.14-0.17	35-45	---	4.5-6.5	6.0-8.9	1.0-2.0	.32	.32			
	29-45	28-45	1.30-1.45	1.40-4.00	0.15-0.18	30-40	---	4.5-6.5	6.0-8.9	0.5-1.0	.32	.32			
	45-70	18-35	1.30-1.50	1.40-4.00	0.19-0.21	15-30	---	5.1-6.5	3.0-5.9	0.0-0.5	.43	.43			
84:															
Vesser-------	0-14	18-26	1.30-1.35	4.00-14.00	0.20-0.22	15-30	---	5.6-7.3	3.0-5.9	2.0-3.0	.43	.43	5	6	48
	14-33	18-24	1.35-1.40	4.00-14.00	0.18-0.22	16-25	---	5.1-6.0	3.0-5.9	1.0-2.0	.55	.55			
	33-60	30-36	1.40-1.45	4.00-14.00	0.17-0.21	25-30	---	5.1-6.5	3.0-5.9	0.0-1.0	.37	.37			

Table 19.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conduc-tivity	Available water capacity	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Linear extensi-bility	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
											Kw	Kf	T		
	In	Pct	g/cc	um/sec	In/in	meq/100g	meq/100g	pH	Pct	Pct					
92:															
Carlow-------	0-11	40-50	1.30-1.40	0.42-1.40	0.15-0.17	---	---	5.1-7.3	6.0-8.9	2.0-4.0	.28	.28	5	4	86
	11-17	35-50	1.35-1.50	1.40-4.00	0.19-0.21	---	---	4.5-6.0	3.0-5.9	2.0-4.0	.32	.32			
	17-60	45-60	1.25-1.35	0.01-0.42	0.14-0.16	---	---	4.5-6.0	6.0-8.9	0.5-2.0	.28	.28			
	60-80	35-60	1.35-1.50	1.40-4.00	0.19-0.21	---	---	4.5-6.5	3.0-5.9	0.5-1.0	.28	.28			
94:															
Zook---------	0-4	35-40	1.30-1.35	1.40-4.00	0.19-0.22	27-41	---	5.6-7.3	6.0-8.9	1.2-6.0	.37	.37	5	7	38
	4-46	36-47	1.30-1.45	0.42-1.40	0.11-0.16	34-41	---	5.6-7.8	6.0-8.9	2.0-4.0	.28	.28			
	46-60	20-45	1.30-1.45	0.42-1.40	0.11-0.22	27-36	---	5.5-7.8	6.0-8.9	0.0-2.0	.37	.37			
98:															
Wabash-------	0-26	40-52	1.25-1.45	0.01-0.42	0.12-0.14	30-40	---	5.1-7.3	9.0-25.0	2.0-4.0	.28	.28	5	4	86
	26-80	40-60	1.20-1.45	0.01-0.42	0.08-0.12	28-42	---	5.1-7.8	9.0-25.0	1.0-2.0	.28	.28			
99F:															
Putco--------	0-4	27-50	1.10-1.30	0.42-1.40	0.08-0.16	25-30	---	6.6-8.4	3.0-5.9	0.5-1.0	.28	---	5	4	86
	4-80	40-60	1.40-1.60	0.42-1.40	0.04-0.13	25-30	---	7.4-8.4	6.0-8.9	0.0-0.5	.24	---			
Pits---------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	8	---
Dumps.															
99002:															
Orthents-----	0-60	18-35	1.45-1.65	0.00-14.00	0.12-0.18	---	---	---	3.0-5.9	---	.32	---	5	6	48
	60-80	---	---	0.00-14.00	---	---	---	---	---	---	---	---			
99005:															
Orthents.															
M-W:															
Miscellaneous water.															
W:															
Water.															

Table 20.--Water Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
10A:							
Sturges	D	None	---	---	0.5-1.5	Perched	Nov-May
12A:							
Crestmeade	D	None	---	---	0.5-1.5	Perched	Nov-May
14B:							
Grundy	C	None	---	---	1.0-2.5	Perched	Nov-Apr
20F:							
Locksprings	B	None	---	---	1.5-3.0	Perched	Nov-Apr
21B:							
Weller	C	None	---	---	2.0-4.0	Perched	Nov-Jul
22C:							
Weller	C	None	---	---	2.0-4.0	Perched	Nov-Jul
26C2:							
Chillicothe	B	None	---	---	2.0-3.5	Perched	Nov-May
28C:							
Greenton	C	None	---	---	1.0-2.5	Perched	Nov-Apr
28D2:							
Greenton	C	None	---	---	1.0-2.5	Perched	Nov-Apr
30B:							
Sampsel	D	None	---	---	0.0-1.5	Perched	Nov-May
34B2:							
Lagonda	C	None	---	---	1.5-2.5	Perched	Nov-Apr
34C2:							
Lagonda	C	None	---	---	1.5-2.5	Perched	Nov-Apr
36D2:							
Lamoni	C	None	---	---	1.0-3.0	Perched	Nov-Jul
62D2:							
Caleb	B	None	---	---	3.0-5.0	Perched	Nov-Mar
70C2:							
Dawn	B	None	---	---	1.5-3.0	Perched	Nov-Apr
72F:							
Gosport	C	None	---	---	>6	---	---
73:							
Sandover	A	Frequent	Very brief	Jan-Jun	2.0-3.0	Apparent	Mar-Jun
74:							
Dockery	C	Frequent	Very brief	Nov-Jun	1.5-2.5	Apparent	Nov-Jun
78:							
Colo	B/D	Occasional	Very brief	Feb-Nov	0.0-1.0	Apparent	Nov-Jul

Table 20.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
80:							
Tice	B	Frequent	Very brief	Nov-Jun	1.0-2.0	Apparent	Jan-May
81:							
Tice	B	Occasional	Brief	Nov-Jun	1.0-2.0	Apparent	Jan-May
82A:							
Triplett	D	Rare	Brief	Mar-Jun	0.5-1.5	Perched	Nov-Apr
84:							
Vesser	C	Occasional	Brief	Feb-Nov	0.0-1.0	Apparent	Nov-Jul
92:							
Carlow	D	Frequent	Brief	Apr-Jun	0.0-1.0	Apparent	Nov-Apr
94:							
Zook	C/D	Frequent	Brief	Feb-Nov	0.0-1.0	Apparent	Nov-Jul
98:							
Wabash	D	Frequent	Brief	Nov-May	0.5-1.0	Apparent	Nov-May
99F:							
Putco	B	None	----	---	>6	---	---
Pits.							
Dumps.							
99002, 99005:							
Orthents.							
M-W:							
Miscellaneous water.							
W:							
Water.							

Table 21.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
10A:					
Sturges	---	---	Moderate	High	Moderate.
12A:					
Crestmeade	---	---	High	High	Moderate.
14B:					
Grundy	---	---	High	High	Moderate.
20F:					
Locksprings	Bedrock (lithic)	>28	Moderate	Moderate	Moderate.
21B:					
Weller	---	---	High	High	High.
22C:					
Weller	---	---	High	High	High.
26C2:					
Chillicothe	Bedrock (lithic)	60-80	Moderate	Moderate	Moderate.
28C:					
Greenton	---	---	Moderate	High	Moderate.
28D2:					
Greenton	Bedrock (paralithic)	50-60	Moderate	High	Moderate.
30B:					
Sampsel	---	---	High	High	Low.
34B2:					
Lagonda	---	---	High	High	Low.
34C2:					
Lagonda	---	---	High	High	Low.
36D2:					
Lamoni	---	---	Moderate	High	Moderate.
62D2:					
Caleb	---	---	Moderate	Moderate	Moderate.
70C2:					
Dawn	Bedrock (paralithic)	>37	Low	Low	High.
72F:					
Gosport	Bedrock (paralithic)	>39	Moderate	High	High.
73:					
Sandover	---	---	Low	Moderate	Moderate.
74:					
Dockery	---	---	High	Moderate	Low.
78:					
Colo	---	---	High	High	Moderate.

Table 21.--Soil Features--Continued

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
80:					
Tice	---	---	High	High	Low.
81:					
Tice	---	---	High	High	Low.
82A:					
Triplett	---	---	High	High	Moderate.
84:					
Vesser	---	---	High	High	Moderate.
92:					
Carlow	---	---	Moderate	High	Moderate.
94:					
Zook	---	---	High	High	Moderate.
98:					
Wabash	---	---	Moderate	High	Moderate.
99F:					
Putco	---	---	Moderate	High	Low.
Pits	Bedrock (lithic)	0-60	---	---	---
Dumps.					
99002, 99005:					
Orthents.					
M-W:					
Miscellaneous water.					
W:					
Water.					

Table 22.--Classification of the Soils

Soil name	Family or higher taxonomic class
Caleb	Fine-loamy, mixed, active, mesic Mollic Hapludalfs
Carlow	Fine, smectitic, mesic Vertic Endoaquolls
Chillicothe	Fine, smectitic, mesic Oxyaquic Vertic Argiudolls
Colo	Fine-silty, mixed, superactive, mesic Cumulic Endoaquolls
Crestmeade	Fine, smectitic, mesic Vertic Argialbolls
Dawn	Coarse-loamy, mixed, superactive, mesic Oxyaquic Hapludolls
Dockery	Fine-silty, mixed, superactive, nonacid, mesic Aquic Udifluvents
Gosport	Fine, illitic, mesic Oxyaquic Dystrudepts
Greenton	Fine, smectitic, mesic Aquertic Argiudolls
Grundy	Fine, smectitic, mesic Aquertic Argiudolls
Lagonda	Fine, smectitic, mesic Aquertic Argiudolls
Lamoni	Fine, smectitic, mesic Aquertic Argiudolls
Locksprings	Clayey-skeletal, mixed, superactive, mesic Oxyaquic Hapludalfs
Orthents	Orthents
Putco	Fine, mixed, superactive, calcareous, mesic Typic Udorthents
Sampsel	Fine, smectitic, mesic Vertic Argiaquolls
Sandover	Sandy over loamy, mixed, superactive, nonacid, mesic Aquic Udifluvents
Sturges	Fine, smectitic, mesic Vertic Argialbolls
Tice	Fine-silty, mixed, superactive, mesic Fluvaquentic Hapludolls
Triplett	Fine, smectitic, mesic Vertic Argialbolls
Vesser	Fine-silty, mixed, superactive, mesic Argiaquic Argialbolls
Wabash	Fine, smectitic, mesic Cumulic Vertic Endoaquolls
Weller	Fine, smectitic, mesic Aquertic Chromic Hapludalfs
Zook	Fine, smectitic, mesic Cumulic Vertic Endoaquolls